AGENDA ADDENDUM

REGULAR MEETING OF COUNCIL

Monday, July 23, 2012
7:00 p.m.
Council Chamber, Municipal Hall
355 West Queens Road,
North Vancouver, BC

Council Members:
Mayor Richard Walton
Councillor Roger Bassam
Councillor Robin Hicks
Councillor Mike Little
Councillor Doug MacKay-Dunn
Councillor Lisa Muri
Councillor Alan Nixon

NORTH VANCOUVER
DISTRICT

www.dnv.org

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District of North Vancouver
355 West Queens Road
North Vancouver, BC, Canada V7N 4N5
604-990-2311
www.dnv.org

REGULAR MEETING OF COUNCIL

7:00 p.m.
Monday, July 23, 2012
Council Chamber, Municipal Hall
355 West Queens Road, North Vancouver

AGENDA ADDENDUM

THE FOLLOWING LATE ITEMS ARE ADDED TO THE PUBLISHED AGENDA

8. REPORTS FROM COUNCIL OR STAFF

8.5. Bylaw 7939: Zoning Text Amendment – The Corner Store **p. 7 - 9**
File No. 08.3060.20/037.12

Recommendation:
THAT
1. Bylaw 7939 is read a SECOND and THIRD time; and,
2. Bylaw 7939 is ADOPTED.

8.7. District of North Vancouver Heritage Register **p. 11 - 12**
File No. 13.6800.01/000.000

Recommendation:
THAT
1. Council adopt the District of North Vancouver Heritage Register as attached to the report of the Community Planner dated June 25, 2012, but excluding the following properties:
    - 1005 Cortell Street
    - 281 East Windsor Road

2. Heritage Procedure Bylaw 7945 is given FIRST, SECOND, and THIRD readings; and,

3. Notice be given within 30 days to owners of all properties on the Heritage Register in accordance with s. 974 of the *Local Government Act* and to the minister responsible for the *Heritage Conservation Act* in accordance with s. 977 of the *Local Government Act*.

8.8. 2672 Panorama Drive – Revised Development Permit 76.11 **p. 13 - 49**
File No. 08.3060.20/076.11

Recommendation:
THAT Council issue DP 76.11 as revised and attached to the agenda addendum report prepared by the Planning Assistant dated July 19, 2012.

8.9. 280 Lloyd Avenue (Grant Connell Tennis Centre) – Revised Development Permit 40.12 **p. 51 - 108**

File No. 08.3060.20/040.12

Recommendation:

THAT Council issue Development Permit 40.12 for a three-court expansion to the Grant Connell Tennis Centre as revised and attached to the agenda addendum report prepared by the Development Planner dated July 19, 2012.

REPORTS

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COUNCIL AGENDA/INFORMATION		
☐ In-Camera	Date: _____	Item # _____
☐ Regular	Date: _____	Item # _____
☐ Info Package	Date: _____	Item # _____
☑ Agenda Addendum	Date: JULY 23 2012	Item # 8.5

Dept. Manager	Director	Municipal Manager

The Corporation of the District of North Vancouver

REPORT TO COUNCIL

File: 3060.20/037.12
July 19, 2012

AUTHOR: Jennifer Paton, Section Manager, Development Planning

SUBJECT: **1096 W. 22nd St – Rezoning Bylaw 7939**
Bylaw Adoption

RECOMMENDATION: It is recommended that:

1. Bylaw 7939 be read a second and third time;
2. Bylaw 7939 be adopted.

REASON FOR REPORT: To refer bylaw 7939 back to Council for consideration following the Public Hearing.

SUMMARY: The District of North Vancouver Rezoning Bylaw 1282 (Bylaw 7939) received first reading on 18 June, 2012. A Public Hearing was held on 17 July, 2012. The bylaw is now ready to be read a second and third time and adopted by Council. .

BACKGROUND: The site is The Corner Store located on the corner of W. 22nd St and Lloyd Avenue in Pemberton Heights.

The applicant has provided a signed covenant that prohibits the preparation of foods creating grease-laden vapours unless and until a commercial grade kitchen ventilation system is installed. If Bylaw 7939 is adopted, the covenant will be registered on title. As the only item required for adoption has now been provided, Bylaw 7939 is now ready for consideration of adoption.

Jennifer Paton
Section Manager, Development Planning

REVIEWED WITH:	REVIEWED WITH:	REVIEWED WITH:	REVIEWED WITH:
☐ Communications	☐ Finance	External Agencies:	Advisory Committees:
☐ Env. Protection	☐ Fire Services	☐ Recreation Commission	☐ _____
☐ Human Resources	☐ Legislative Services	☐ Library Board	☐ _____
☐ Eng. Public Works	☐ Land	☐ Health Dept.	☐ _____
☐ Eng. Admin.	☐ Permits & Licenses	☐ RCMP	
☐ Eng. Parks	☐ Planning	☐ Other: _____	
	☐ Social Planning		

The Corporation of the District of North Vancouver

Bylaw 7939

A bylaw to amend The District of North Vancouver Zoning Bylaw 3210, 1965 (Pemberton Heights)

The Council for The Corporation of the District of North Vancouver enacts as follows:

1. Citation

This bylaw may be cited as "The District of North Vancouver Rezoning Bylaw 1282 (Bylaw 7939)".

2. Amendments

The District of North Vancouver Zoning Bylaw 1965, Part 6 Commercial Zone Regulations is amended by adding a new subsection 616.3.4 as follows:

616.3.4 In the case of the corner store in Pemberton Heights at 2230 Lloyd Avenue (Lot 26, Block 4, District Lot 552, Plan 3412, PID: 012-916-595):

(a) the floor space devoted to cafe use is limited to 30% of the gross floor area of that part of the building used for local commercial purposes, excluding all outdoor seating areas;
(b) the maximum number of seats in a cafe use, excluding all outdoor seating areas, is limited to 30;
(c) the on-site preparation of a limited range of foods for sale is permitted; and
(d) the sale of a limited range of alcoholic beverages under a food-primary liquor licence is permitted up to 9p.m.

READ a first time this the 18th day of June, 2012

PUBLIC HEARING held this the 17th day of July, 2012

READ a second time this the

READ a third time this the

ADOPTED this the

Mayor

Municipal Clerk

Certified a true copy

Municipal Clerk

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COUNCIL AGENDA/INFORMATION				
☐ In Camera	Date:		Item #	
☐ Regular	Date:		Item #	
☑ Agenda Addendum	Date:	July 23, 2012	Item#	8.7
☐ Info Package				
☐ Council Workshop	DM#	Date:	Mailbox:	

Dept. Manager | Director | CAO

The District of North Vancouver
REPORT TO COUNCIL

July 19, 2012
6800.01.000.000

AUTHOR: Kathleen Larsen, Community Planner

SUBJECT: District of North Vancouver Heritage Register

RECOMMENDATION:

It is recommended that:

1. Council adopt the District of North Vancouver Heritage Register attached to the Council report dated June 25, excluding the following properties:

    - 1005 Cortell Street
    - 281 East Windsor Road

2. Council give first, second and third readings to Heritage Procedure Bylaw 7945; and

3. Notice be given within 30 days to owners of all properties on the Heritage Register in accordance with s. 974 of the *Local Government Act* and the Minister responsible for the *Heritage Conservation Act* in accordance with s. 977 of the *Local Government Act*.

REASON FOR REPORT:

To put forward a supplemental report advising Council of the results of a mailout to owners of all properties proposed to be included in the Heritage Register and provide an amended recommendation for Council's consideration.

SUMMARY:

At the request of Council a letter was sent to the owners of all properties proposed for the District's Heritage Register. In response to this letter as of 9:00am Friday July 20, 2012 two owners have contacted the District to request that their properties be removed from the Register. It is proposed that these properties be removed from the Heritage Register and the Council recommendation amended accordingly.

Kathleen Larsen
Community Planner

REVIEWED WITH:	REVIEWED WITH:	REVIEWED WITH:	REVIEWED WITH:
❑ Sustainable Community Development	❑ Clerk's Office	External Agencies:	Advisory Committees:
❑ Development Services	❑ Corporate Services	❑ Library Board	❑
❑ Utilities	❑ Communications	❑ NS Health	❑
❑ Engineering Operations	❑ Finance	❑ RCMP	❑
❑ Parks & Environment	❑ Fire Services	❑ Recreation Commission	
❑ Economic Development	❑ Human resources	❑ Other:	
	❑ ITS		
	❑ Solicitor		
	❑ GIS		

COUNCIL AGENDA/INFORMATION

☐ In-Camera	Date:		Item #
☐ Regular	Date:		Item #
☐ Info Package	Date:		Item #
☑ Agenda Addendum	Date:	July 23, 2012	Item # 8.8

Dept. Manager | Director | Municipal Manager acting

The Corporation of the District of North Vancouver

REPORT TO COUNCIL

File: 3060.20/076.11
July 19, 2012

AUTHOR: Casey Peters, Planning Assistant

SUBJECT: 2672 Panorama Dr – Revised Development Permit 76.11

RECOMMENDATION:

That Council issue DP 76.11 as revised and attached to the agenda addendum report prepared by the Planning Assistant dated July 19, 2012.

REASON FOR REPORT:

Following the preparation of the Council Report for the Development Permit, a neighbour to the site (2666 Panorama Dr) wrote Council with concerns regarding the proposed application in particular with the proposed lift and impact of car lights. Staff met onsite with the project Architect and the neighbouring owners to discuss these concerns and potential resolutions. The resolutions arrived at during this meeting have resulted in the need to amend Development Permit 76.11.

SUMMARY DISCUSSION:

During the site meeting the neighbour expressed concerns regarding the appearance of the lift and the potential for noise impacts from the running of the lift. Another concern was expressed regarding the potential impact of car lights if the parking area screen is not of a solid material. The resolutions agreed to are as follows:

- The lift structure will be enclosed by a solid cedar screening structure stained a natural cedar tone;
- The solid cedar screening will have a sound absorbent backing to reduce noise from the operation of the lift;
- A matching 4 ft high solid cedar screen will be similarly placed around the parking deck (stained a natural cedar tone to be compatible with the lift enclosure);
- The screening has been designed to be largely similar to the solid cedar screening material around the parking area at 2666 Panorama (i.e. will tie-in with the look of the neighbour's front yard structure).

A revised Development Permit is attached to this report with a requirement to construct the lift and parking screening as described above. The drawings attached to the permit have been amended to reflect this change. These revised drawings have been sent to the concerned neighbour for review and staff has received confirmation that the plans reflect the changes discussed on site.

The revised proposal results in the need for an additional variance to the maximum height of an accessory structure for the enclosure of the lift due to the additional height of the screening. The amount of variance can be seen in the table below:

Proposed Non-Conforming:

Regulation	Required/ Permitted	New Work	Variance
Maximum Accessory Building Height	3.65 m 12.0 ft	6.36 m 20.875 ft	2.71 m 8.875 ft

Casey Peters
Planning Assistant

Attach: Revised DP 76.11

REVIEWED WITH:	REVIEWED WITH:	REVIEWED WITH:	REVIEWED WITH:
❑ Communications	❑ Finance	External Agencies:	Advisory Committees:
❑ Env. Protection	❑ Fire Services	❑ Recreation Commission	❑ _____
❑ Human Resources	❑ Legislative Services	❑ Library Board	❑ _____
❑ Eng. Public Works	❑ Land	❑ Health Dept.	❑ _____
❑ Eng. Admin.	❑ Permits & Licenses	❑ RCMP	
❑ Eng. Parks	❑ Planning	❑ Other: _____	
	❑ Social Planning		

THE CORPORATION OF THE DISTRICT OF NORTH VANCOUVER

DEVELOPMENT PERMIT 76.11

This Development Permit 76.11 is hereby issued by the Council for The Corporation of the District of North Vancouver to Leslie Ho and Rosita Ho for the development of 2672 Panorama Dr legally described as Lot 94, Block 8, District Lot 626, Plan 5980, (PID: 011-019-239) subject to the following terms and conditions:

A. The following Zoning Bylaw regulations are varied under Section 920(2)(a) of the Local Government Act:

1. The minimum setback from a street to an accessory building (lift) is decreased from 3.05m (10.0 ft) to 0.38m (1.25 ft);

2. The minimum side yard setback to an accessory building (lift) is decreased from 1.22m (4.0 ft) to 0.51m (1.67 ft);

3. The number of accessory buildings (lift) permitted in the front yard is increased from 0 to 1;

4. The maximum height of a retaining wall in the required front yard is increased from 1.22m (4.0 ft) to 6.19m (20.30 ft);

5. The maximum height of an accessory building (lift enclosure) is increased from 3.65m (12.0 ft) to 6.36m (20.875 ft).

6. The maximum principal building height is increased from 7.92m (26.00 ft) to 9.24m (30.31ft); and

7. The maximum principal building eave height is increased from 6.71m (22.0 ft) to 8.61m (28.25ft).

B. The following requirement is imposed under Subsection 920(2)(c) of the Local Government Act:

Substantial construction as determined by the Manager of Permits and Licenses shall commence within two years of the date of this permit or the permit shall lapse.

C. The following requirements are imposed under Subsections 920(7) and 920 (10.1) of the Local Government Act:

1. The site shall be developed in accordance with the attached plans and reports (76.11A to 76.11K);

i. Prior to issuance of a Building Permit a completed Green Building Checklist, Energy Modelling Report and Energy Performance Commitment must be submitted. The 10.5m² (113 sq ft) floorspace bonus is only permitted if Energuide 86 is achieved.

ii. The development will include the installation of an enclosure around the lift of horizontal cedar siding with sound absorbent material and a 4ft fence around the parking deck constructed of horizontal cedar siding as shown on drawings 76.11D and E.

2. For greater certainty:

i. No other buildings, structures, paving or other impervious surfaces or alteration of land shall be constructed within the Protected Area (15m from top of bank) as outlined on the attached plans, except as exempted by Schedule B, Section 2.3 (Streamside Protection Development Permit Area Guidelines) of the District of North Vancouver Official Community Plan;

ii. No material of any kind, including grass clippings, compost material or other yard waste be placed within the 5m Protected Area.

3. During construction the recommendations included in the arborist report prepared by Radix Tree and Landscape Consulting dated April 2, 2012 must be followed for the protection of the District Spruce tree and the private Cedar tree.

4. New riparian planting is required as compensation for the disturbed portion of the Protected Area, with a minimum planted area of 20.5m² (221 sq ft).

5. Construction on the site must adhere to all requirements of the Environmental Protection and Preservation Bylaw, including, but not limited to:

i. During the project extreme care must be taken to ensure that absolutely no cement wash or other substance deleterious to Aquatic life enter the Creek, Creek bank or the storm water system.

ii. Soil removal and excavation is permitted on the site for foundation work only.

iii. Excavated soil is to be removed from the District of North Vancouver or to a site approved by the building inspector.

iv. Sediment and erosion control for the site to be as per the standard plan and maintained in compliance with the EPPB at all times.

v. Imported soil and fill for the site must comply with residential contaminant criteria as per the EPPB.

vi. CDNV equipment called in to clean sediment from the roads will be charged to the project.

i. A copy of the permit to be on site at all times.

6. Prior to the issuance of a Occupancy Permit, the following shall be completed:

(a) Riparian planting as detailed in the Environmental Assessment Reports prepared by Phoenix Environmental Services Ltd, dated January 10, 2011 and October 3, 2011.

D. The following requirements are imposed under Subsections 925(1) & (2) of the Local Government Act:

1. A security deposit equal to 125% of the estimated cost of all landscaping, in accordance with the approved cost estimate. The deposit will be held as security for landscaping, building and environmental works.

2. A security deposit equal to 1% of the cost of construction to ensure the site achieves compliance with the Green Building Checklist and Energuide 86.

_____

Mayor

_____

Manager, Administrative Services

Dated this the day of, 20

ATTACHMENT 76.11A.

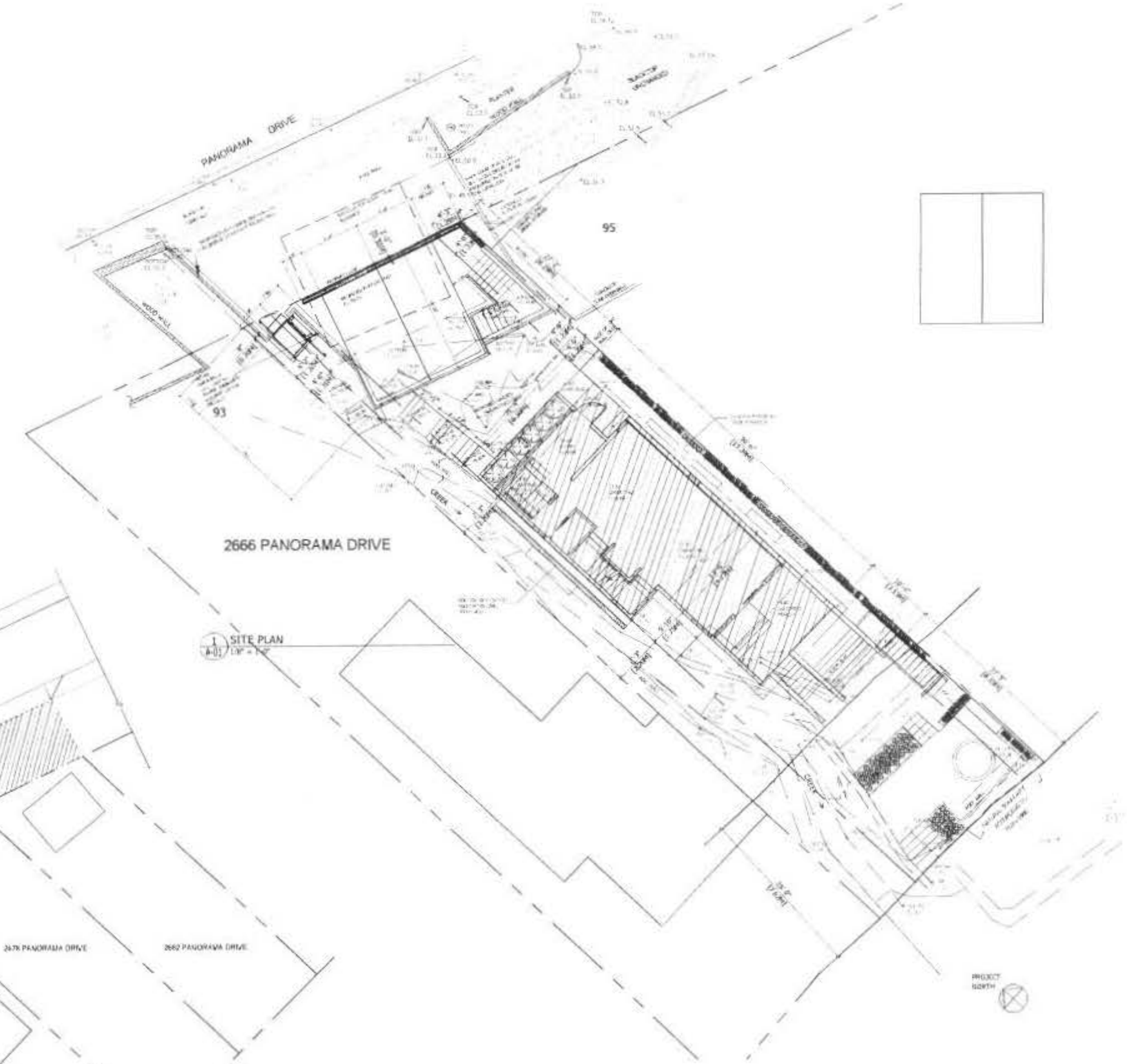
Address: 2672 PANORAMA DRIVE, NORTH VANCOUVER, B.C.
LEGAL DESCRIPTION
Lot 94 Block B District Lot 620 Plan 5792

SITE COVERAGE STATEMENT
Permitted: 1,101.10 SQ. FT. 35.00 %
Proposed: 1,019.49 SQ. FT. 32.41 %

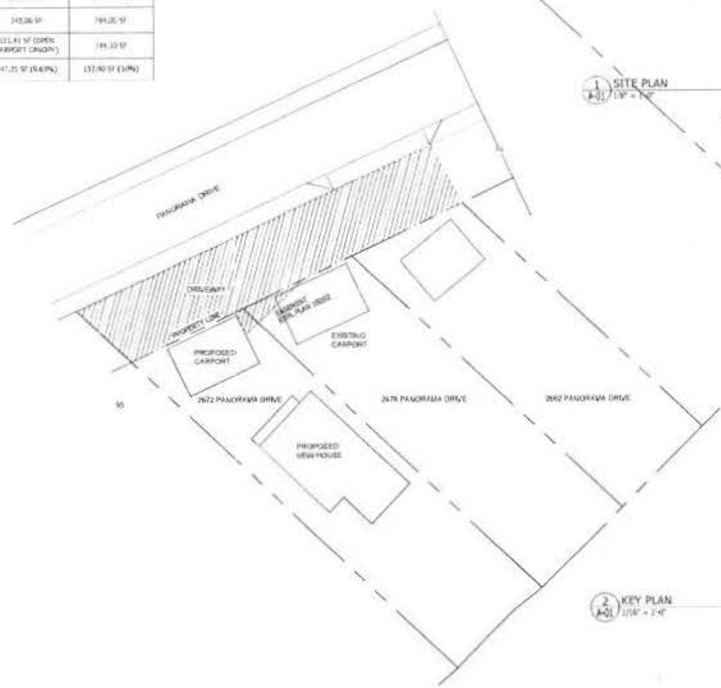
PROPOSED SITE COVERAGE AREAS INDICATED BY HATCHED AREAS ON SITE PLAN

Existing Zoning: RS4
Existing Lot: Width: 32.70' Length: 127.90' East 136.80' West
Existing Lot Area: 4,014.00 SF - (868.00 SF STREAM AREA) = 3,146.00 SF

	PROPOSED	MAX. ALLOWABLE
NORTH SET BACK: FRONT	27.34' TO MAIN ENTRANCE & 7.75' CAR PORT	25.00'
SOUTH SET BACK: REAR	25.00'	25.00'
EAST SET BACK	4.00'	4.00'
WEST SET BACK	5.16'	4.00'
BUILDING HEIGHT		
BUILDING DEPTH	54.00' (BASEMENT)	55.00'
LOT COVERAGE	1,019.49 SF (32.41%) (HOUSE COVERAGE + CARPORT COVERS [illegible])	1,101.10 SF (35%)
IMPERMEABLE AREA		
ABOVE GRADE AREA	1,538.06 SF	
AVERAGE GRADE		
FLOOR AREA RATIO		1,415.70 SF (45%) + 113.25 SF (ENERGUIDE 3.6%) = 1528.95 SF
FLOOR AREA:		
BASEMENT AREA	0.00 SF	
GROUND FLOOR AREA	710.52 SF	
SECOND FL. AREA	433.71 SF	
LOFT AREA	374.83 SF	
Total Floor Area	1,528.05 SF	1,528.95 SF
TRELLISES	143.36 SF	764.20 SF
GARAGE	121.41 SF (OPEN CARPORT CANOPY)	314.10 SF
COVERED PORCH	147.25 SF (9.63%)	152.90 SF (10%)



1 SITE PLAN
A-01 1/8" = 1'-0"



2 KEY PLAN
A-01 1/16" = 1'-0"

TRUE NORTH

PROJECT NORTH

THIS DRAWING CONFORMED TO THE LATEST EDITION OF BRITISH COLUMBIA BUILDING CODE 2006.

REVISIONS:

No.	Date
00	2010.09.23
01	2012.06.21

CANARCH DESIGN LTD.

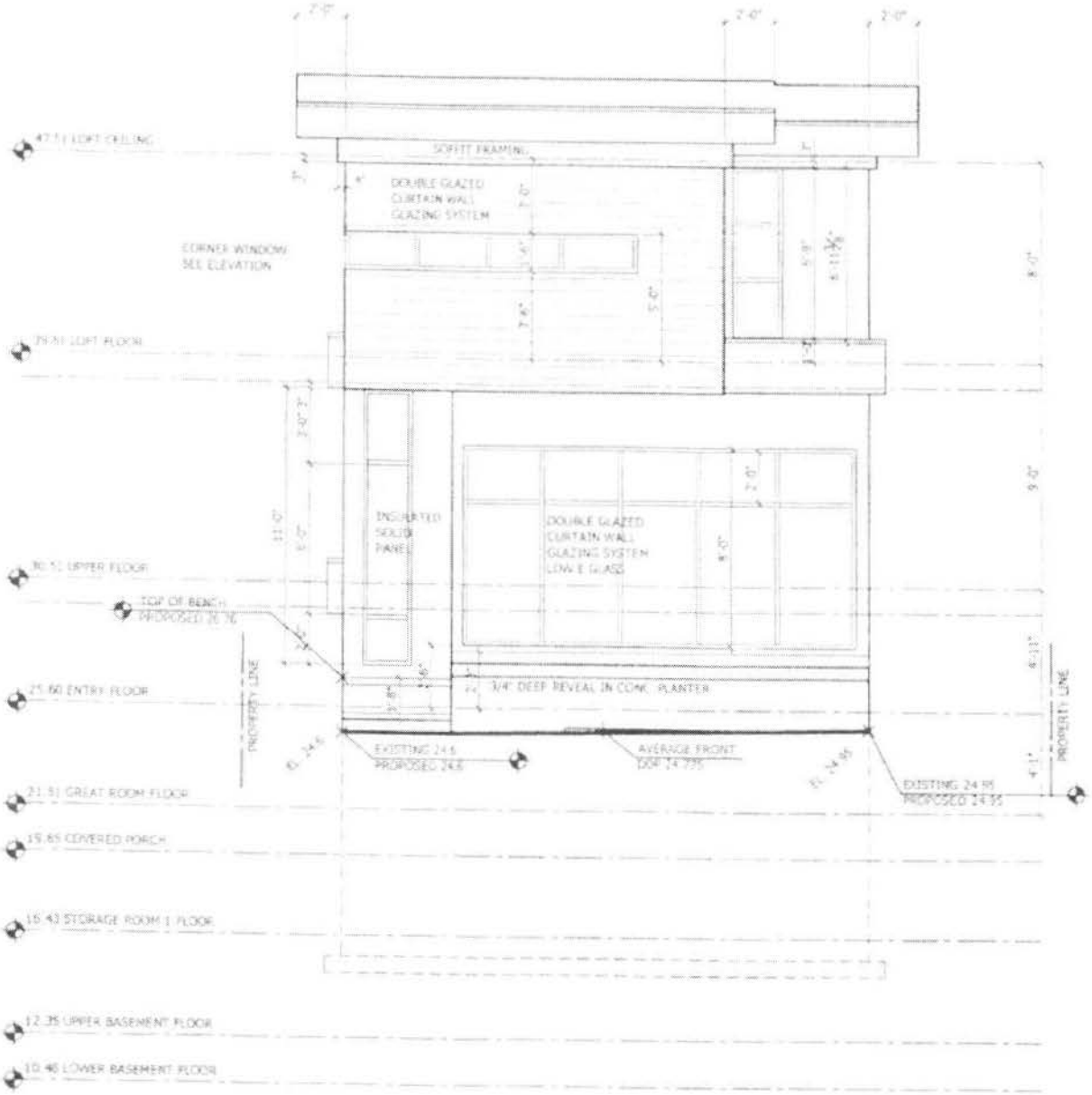
JOB TITLE:
HO RESIDENCE
2672 Panorama Drive
North Vancouver, B.C.

DRAWING:
SITE PLAN

JOB NO.:	
DRAWN:	Carmen Chin
CHECKED:	Ken Fung
DATE:	Sept. 23, 2010.
SCALE:	1/8" = 1'-0"

DRAWING NO.:
A-01

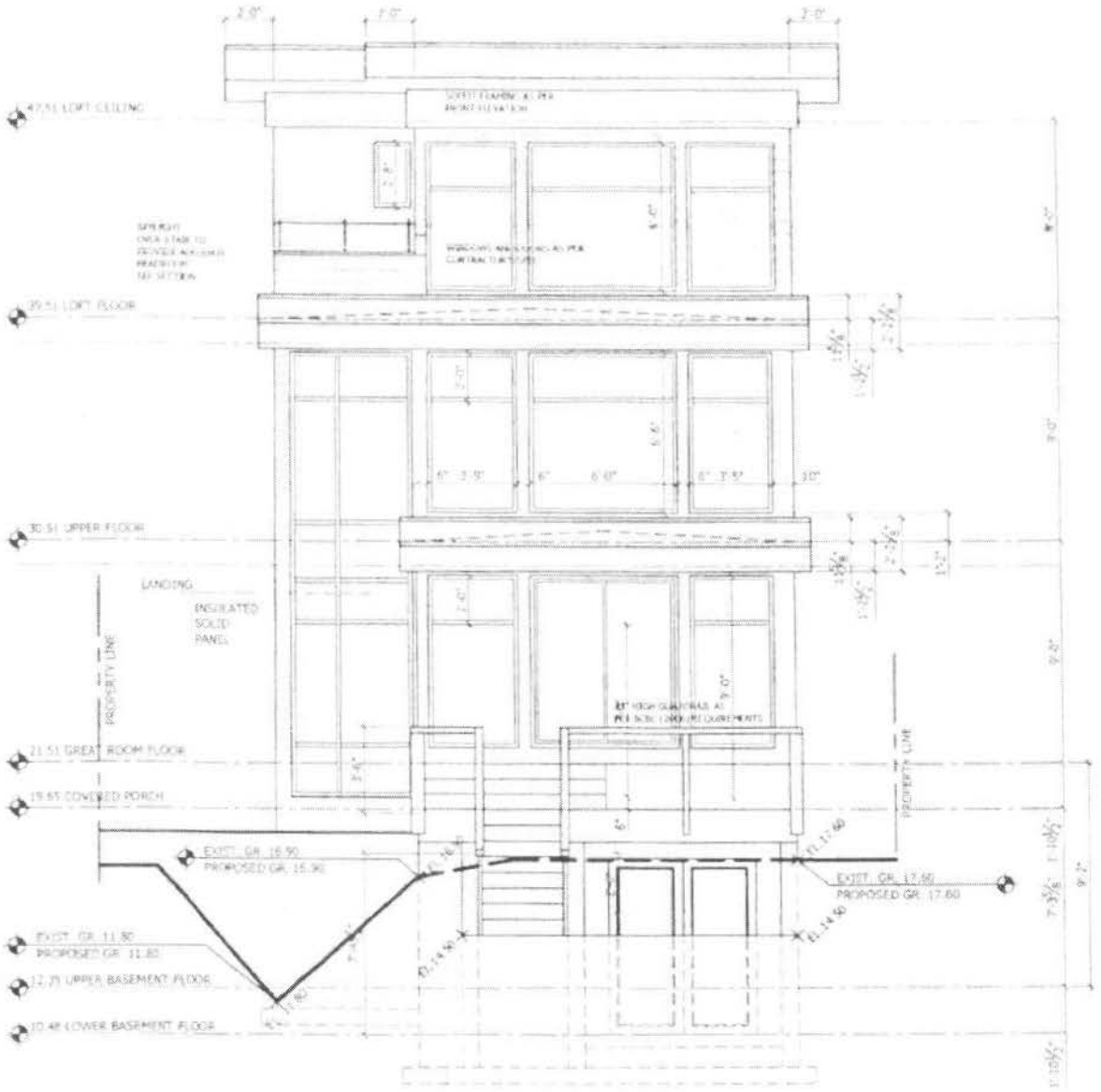
ATTACHMENT 76.11B



E1 / A-02 NORTH ELEVATION - FRONT

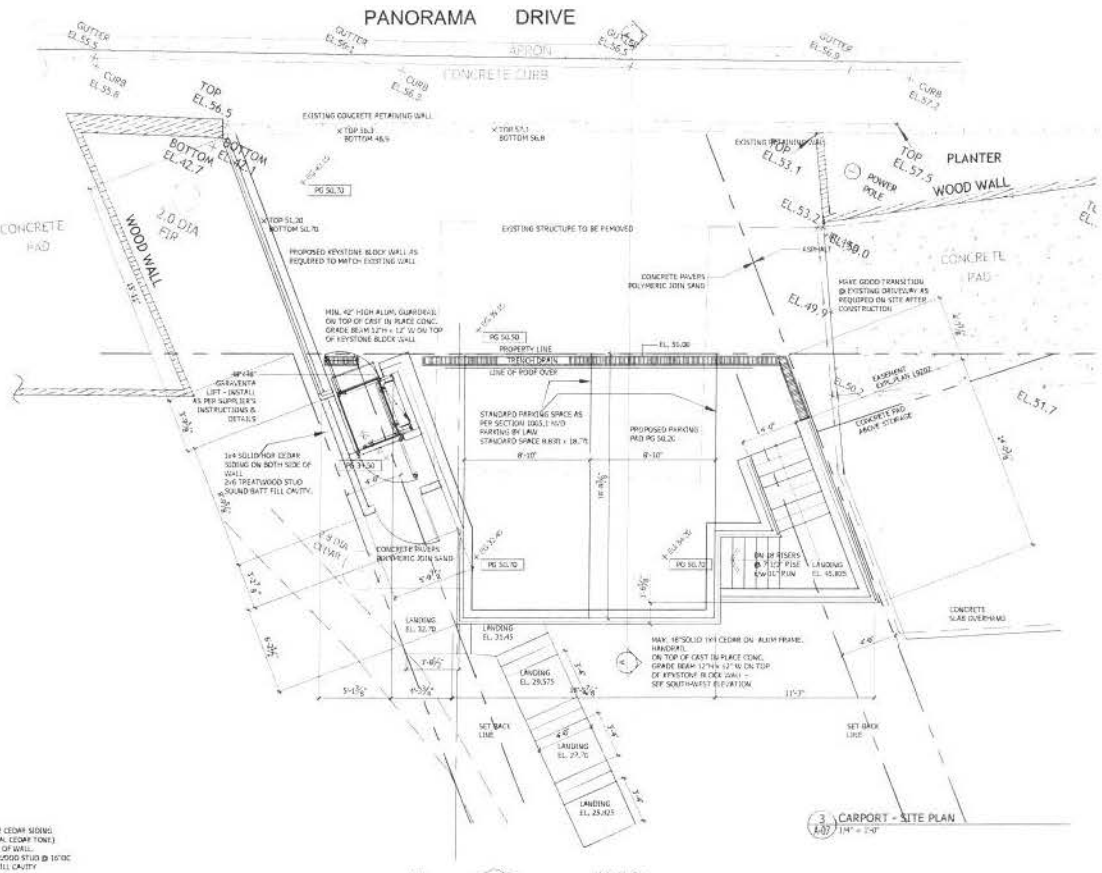
1/4" = 1'-0"

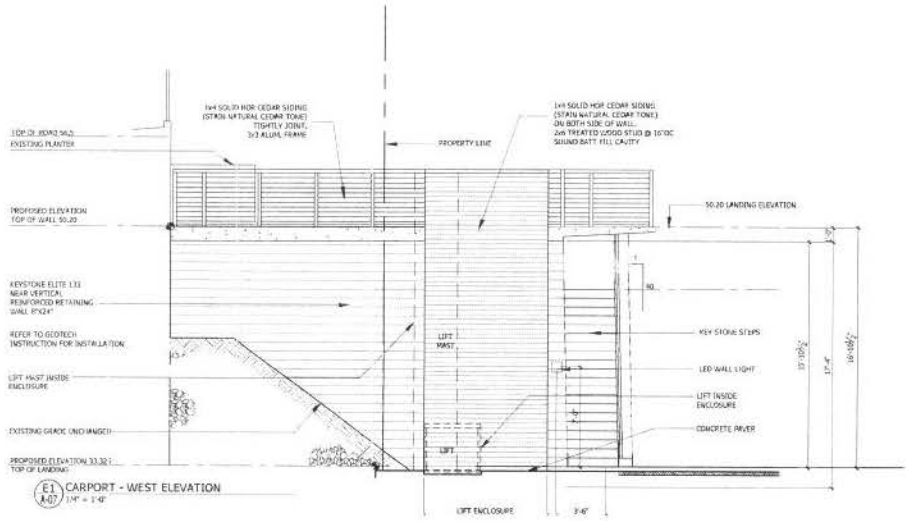
ATTACHMENT 76.11C

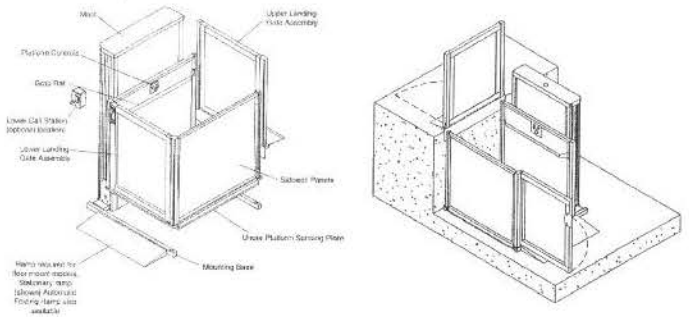


E2 / A-03 SOUTH ELEVATION - REAR
1/4" = 1'-0"

ATTACHMENT #11







existing elevation
PG 000.0 proposed elevation

NORTH
PROJECT NORTH

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REVISIONS:

No.	Date
00	2010.09.23
01	2012.06.21

CANARCH DESIGN LTD.
[illegible]

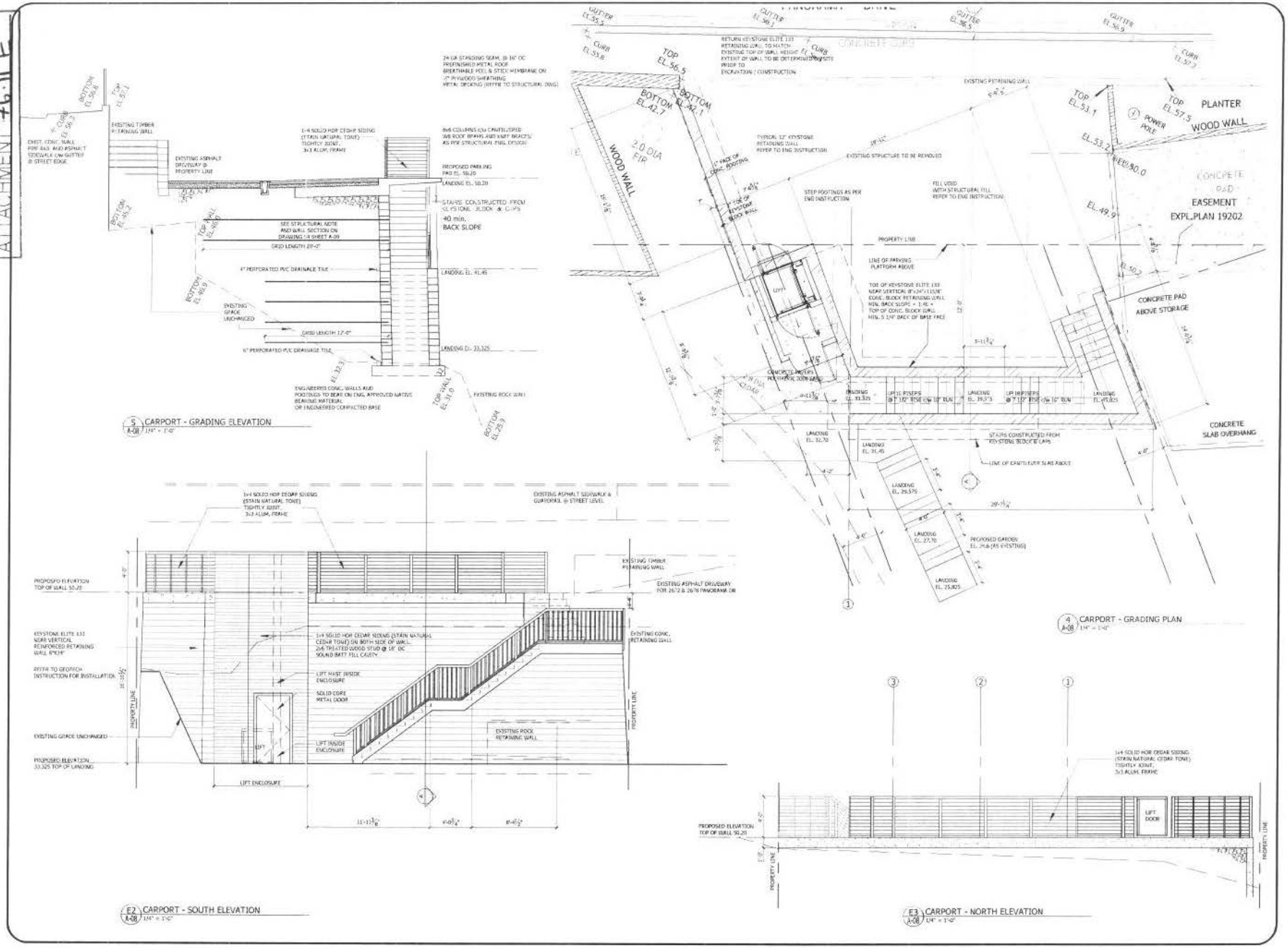
JOB TITLE:
HO
RESIDENCE
2672 Panorama Drive
North Vancouver, B.C.

DRAWING:
CARPORT PLANS AND ELEVATION

JOB NO.:	
DRAWN:	Carmen Chin
CHECKED:	Ken Fung
DATE:	Sept. 23, 2010.
SCALE:	1/4" = 1'-0"

DRAWING NO.:
A-07

ATTACHMENT 76.11.E



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REVISIONS:	
No.	Date
00	2010.09.23
01	2012.06.21

CANARCH DESIGN LTD.

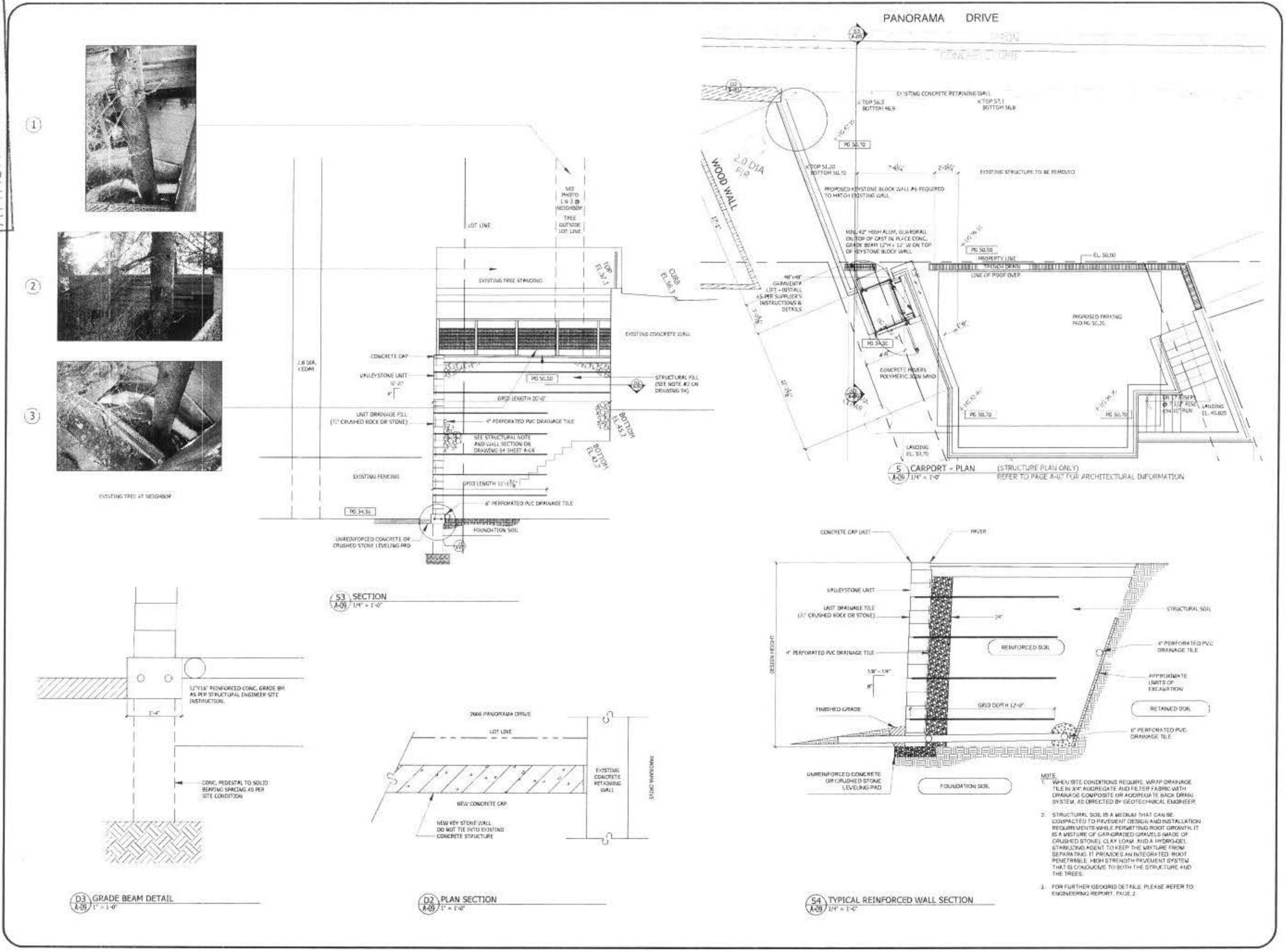
JOB TITLE:
HO
RESIDENCE
2672 Panorama Drive
North Vancouver, B.C.

DRAWING:
CARPORT
GRADING PLAN
AND ELEVATIONS

JOB NO.:	
DRAWN:	Carmen Chin
CHECKED:	Ken Fung
DATE:	Sept. 23, 2010.
SCALE:	1/4" = 1'-0"

DRAWING NO.:
A-08

ATTACHMENT 76-11 F



PROJECT NORTH

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REVISIONS:

No.	Date
00	2010.09.23
01	2012.08.21

CANARCH DESIGN LTD.

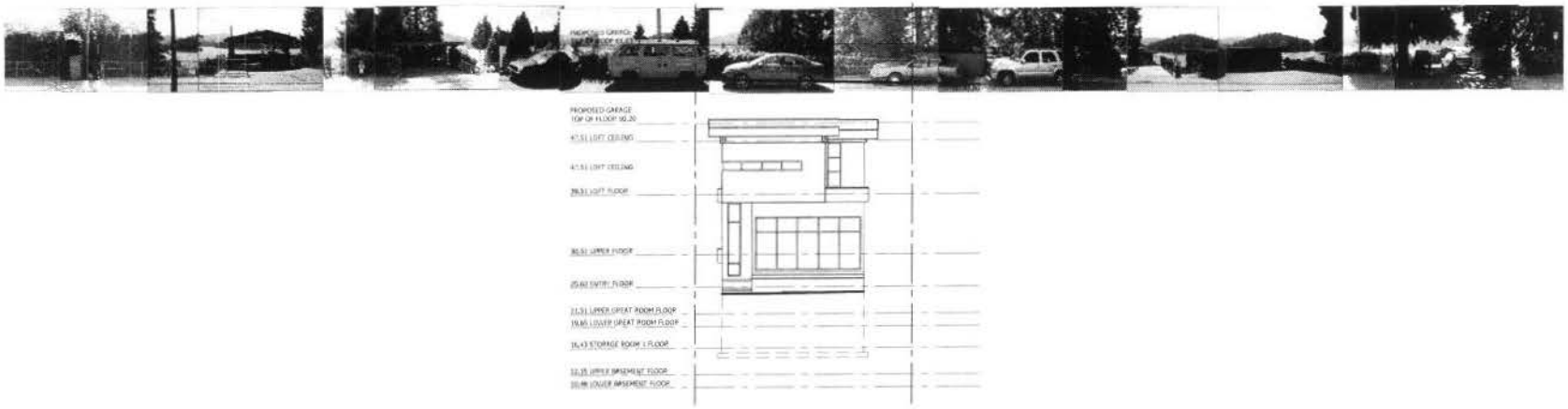
JOB TITLE: HO RESIDENCE
2672 Panorama Drive
North Vancouver, B.C.

DRAWING: CARPORT

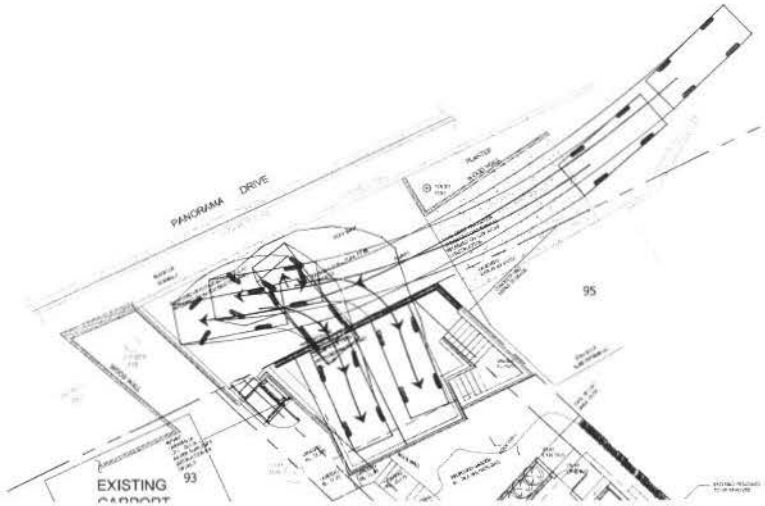
JOB NO.:	
DRAWN:	Carmen Chin
CHECKED:	Ken Fung
DATE:	Sept. 23, 2010
SCALE:	1/4" = 1'-0"

DRAWING NO.: A-09

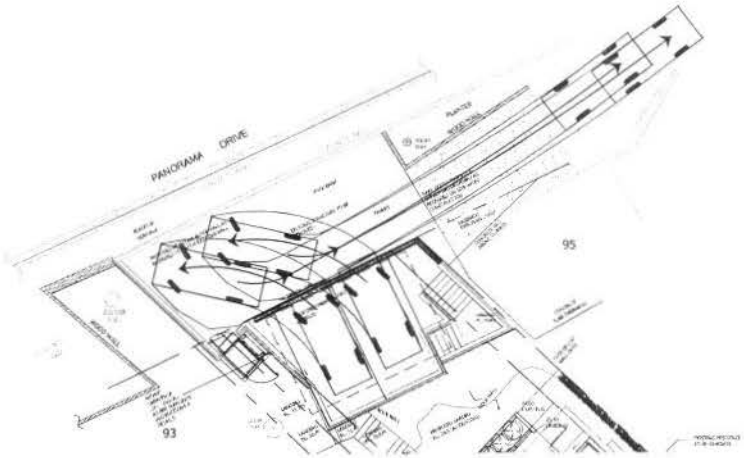
ATTACHMENT 26.11.16



1 A-10 STREETSCAPE & CONTEXT PLAN 1/8" = 1'-0"



2 A-10 CARPORT - AUTOTURN PLAN - CARS ENTERING 1/8" = 1'-0"



3 A-10 CARPORT - AUTOTURN PLAN - CARS EXITING 1/8" = 1'-0"

PROJECT NORTH

THIS DRAWING CONFORMED TO THE LATEST EDITION OF BRITISH COLUMBIA BUILDING CODE 2006.

REVISIONS:

No.	Date
00	2010.09.23
01	2012.06.21

CANARCH DESIGN LTD.

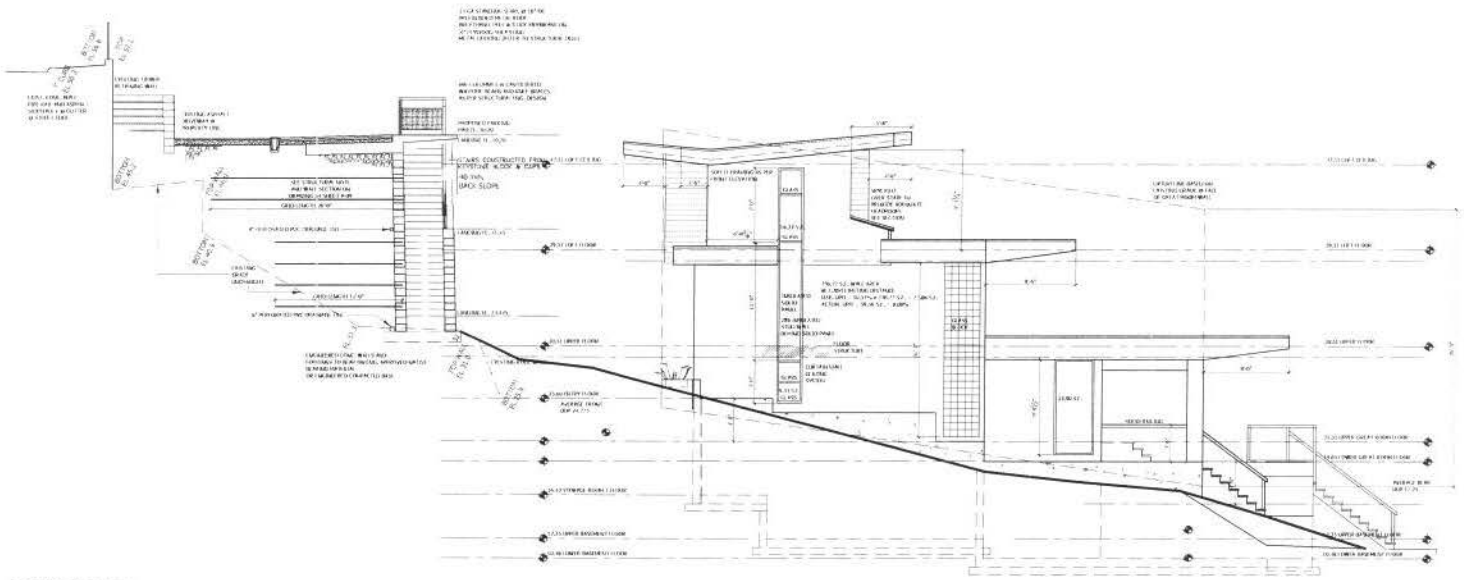
JOB TITLE:
HO
RESIDENCE
2672 Panorama Drive
North Vancouver, B.C.

DRAWING:
STREETSCAPE
CONTEXT PLAN
CARPORT AUTOTURN

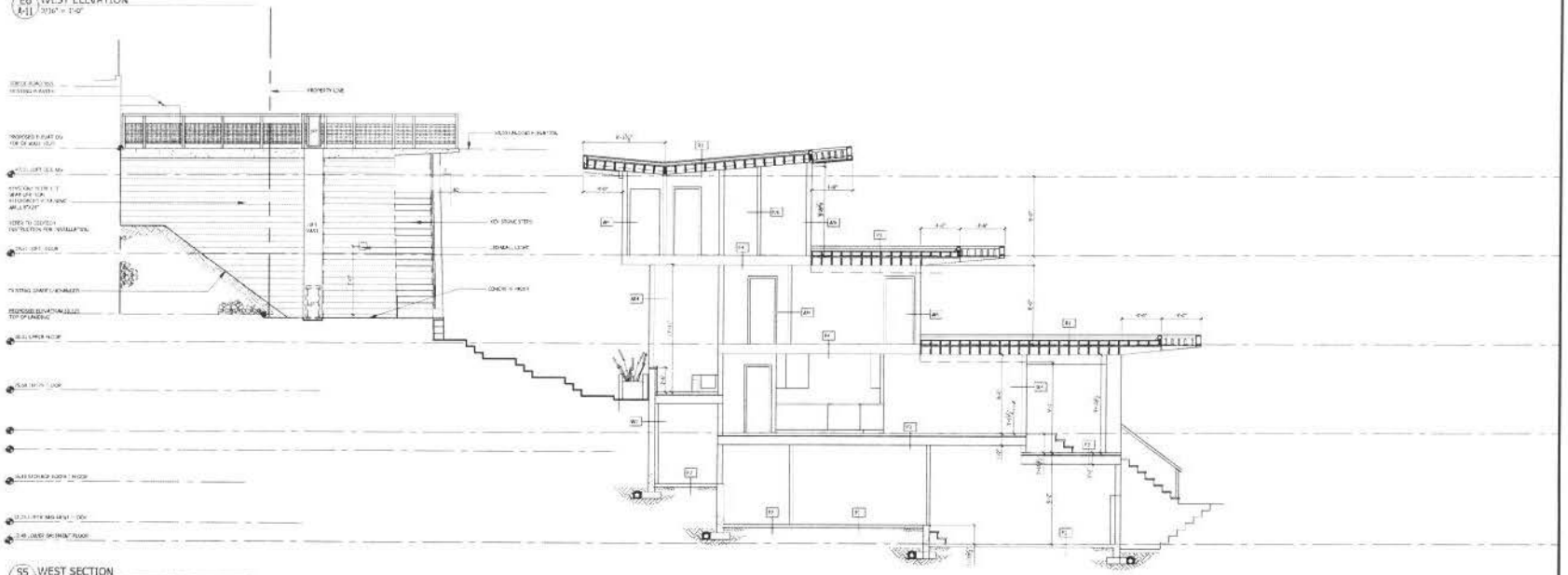
JOB NO.:	
DRAWN:	Carmen Chin
CHECKED:	Ken Fung
DATE:	Sept. 23, 2010.
SCALE:	1/8" = 1'-0"

DRAWING NO.:
A-10

ATTACHMENT 26.11.12



E6 WEST ELEVATION
A-11 3/16" = 1'-0"



S5 WEST SECTION
A-11 3/16" = 1'-0"

NORTH
PROJECT NORTH

THIS DRAWING CONFORMED TO THE LATEST EDITION OF BRITISH COLUMBIA BUILDING CODE 2006.

REVISIONS:

No.	Date
00	2010.09.23
01	2012.06.21

CANARCH DESIGN LTD.
[illegible]

JOB TITLE:
HO
RESIDENCE
2672 Panorama Drive
North Vancouver, B.C.

DRAWING:
WEST ELEVATION & SECTION

JOB NO.:	
DRAWN:	Carmen Chin
CHECKED:	Ken Fung
DATE:	Sept. 23, 2010.
SCALE:	3/16" = 1'-0"

DRAWING NO.:
A-11

RADIX TREE & LANDSCAPE CONSULTING

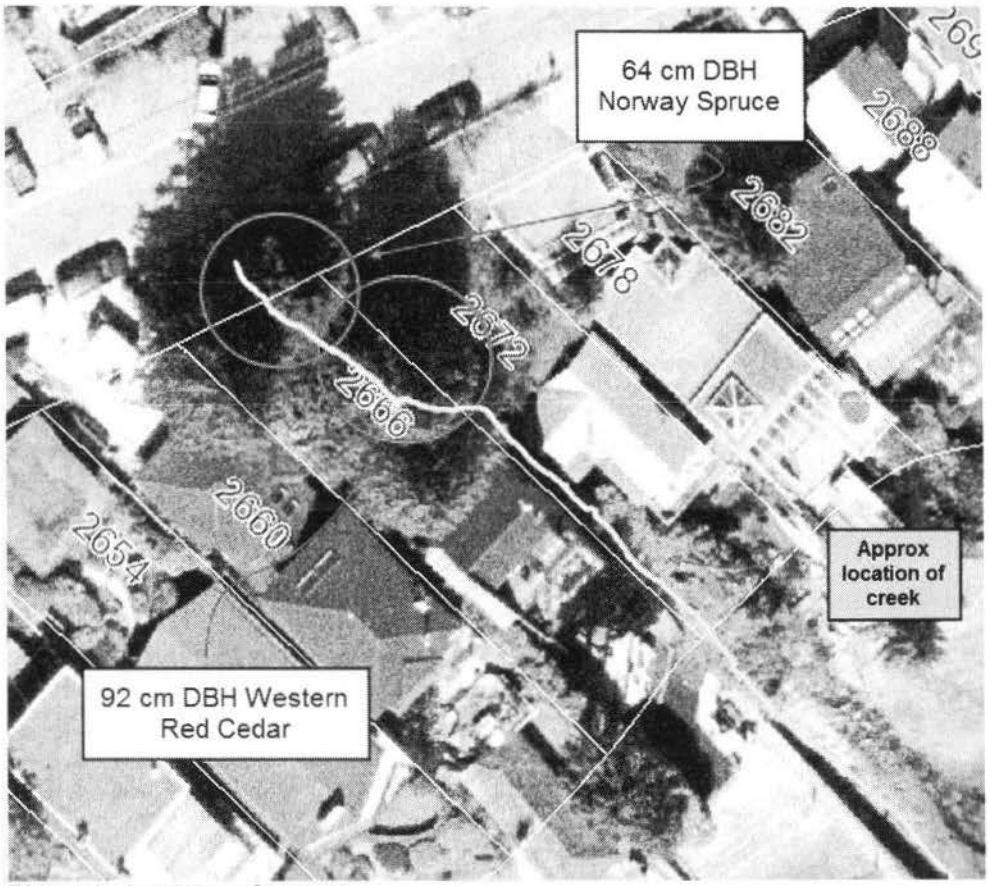
April 2, 2012

Chrisdale Homes
Attn: Ken Fung
#215 – 4946 Canada Way
Burnaby, BC
V5G 4H7

RE: Arborist Report for 2672 Panorama Drive, NV

ASSIGNMENT:

This report is in response to your request to assess two trees located adjacent to the northwest property line at 2672 Panorama Drive. One tree is on DNV property at the northeast corner of 2666 Panorama Drive and the second tree is shared and is straddling the property line. A site plan was provided of the proposed construction for the carport. The intent of this report is to determine the mode of tree protection that would be recommended to preserve these trees from any damage due to the proposed construction at 2672 Panorama Drive as they fall within close proximity to the building footprint and proposed construction activities.



Picture 1. Aerial view of property

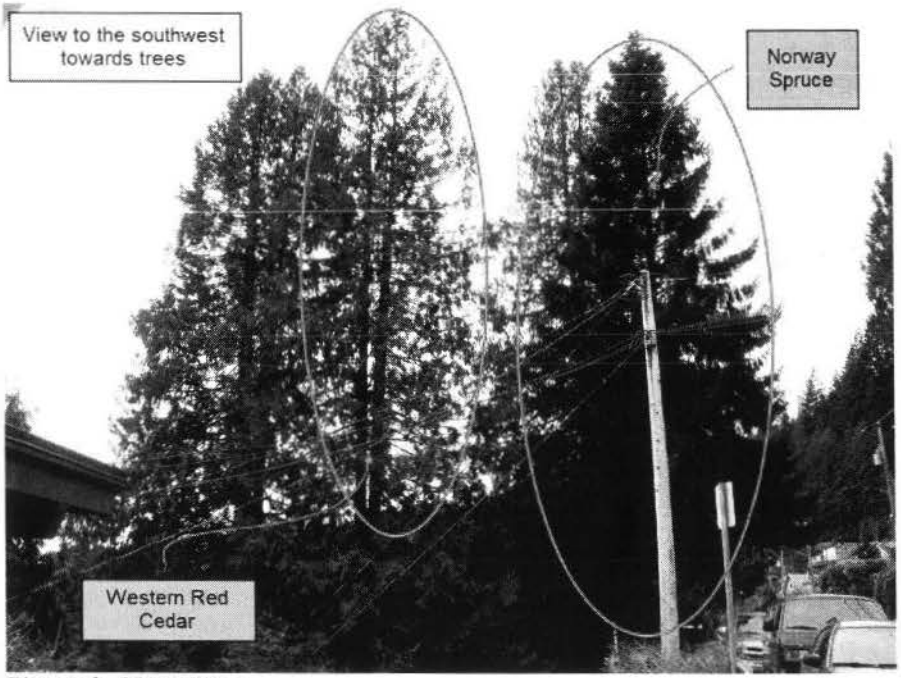
TREE & SITE DETAILS:

Two mature trees were assessed for this report and they consist of Western Red Cedar (*Thuja plicata*) and Norway Spruce (*Picea abies*). The trunk diameters were measured at 1.0 metre above grade (D.B.H), their heights approximated and any observations are noted in Figure 1.

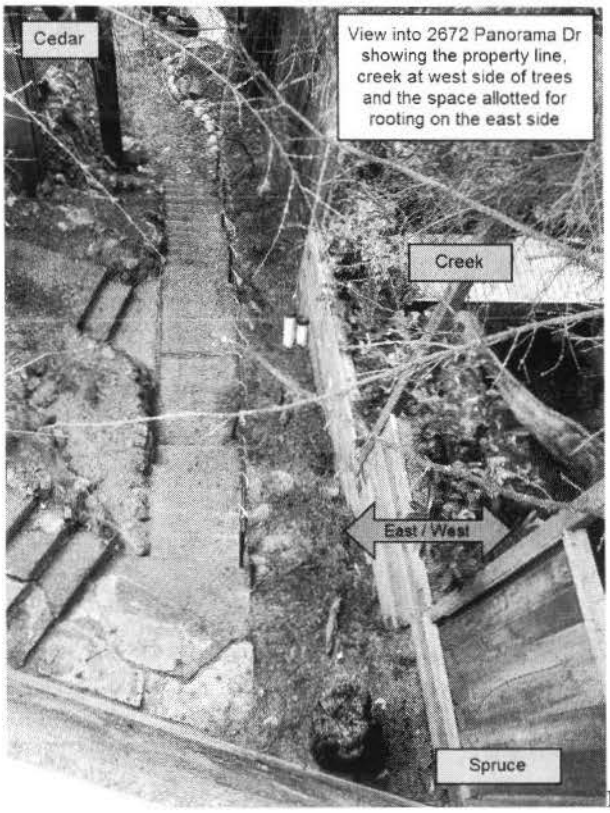
Tree Species	DBH (cm)	Ht (m)	Canopy Radius	Observations
Western Red Cedar *Thuja plicata*	92	22.9	6.0	**Good** – previously topped 6.1 m; co-dominant stems have re-grown; located directly adjacent to the creek; located on private property & straddles property line with 2666 Panorama Dr; high live crown ratio; moderate trunk taper; moderate cone crop; 'bulge' visible in stem at 2.4 m above grade; canopy weighted to the north and east; structural roots are visible at the surface at the east side; flare is visible and isolated to east side of tree; included bark at base of stem union; decommissioned clothes line reel imbedded in trunk; deadwood; structural root visible at west side appears to have been severed at some point in past; sides of creek are mortared right up to tree; moderate cone crop
Norway Spruce – *Picea abies*	64	21.3	4.0	**Good** – not previously topped; located on DNV property at northeast corner of 2666 Panorama Dr adjacent and to the west of property line; high live crown ratio; moderate trunk taper; partially buried root flare; deadwood; moderate cone crop; canopy well balanced; structural root visible extending into 2672 Panorama Dr; visible cracks and heaving in concrete stairs and path nearby; landscape tie raised planter box has been constructed within CRZ parallel to property line at west side

Figure 1. Inventory table

This lot was notable narrow and long in shape and there is a creek that runs along the west side of the trees down to the ocean. The sides of the creek have been constructed of river rock and mortar. It is expected that based on the site's growing conditions and the location of these trees that the placement of the roots is atypical and likely that the available root space is limited to the east side of the property line extending into 2672 Panorama Drive.



Picture 2. View of trees

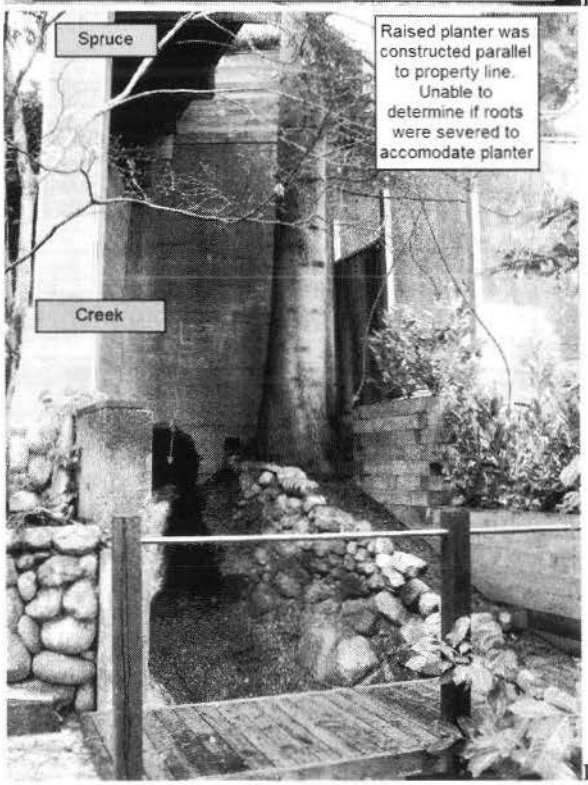


Picture 3. View into property from street above

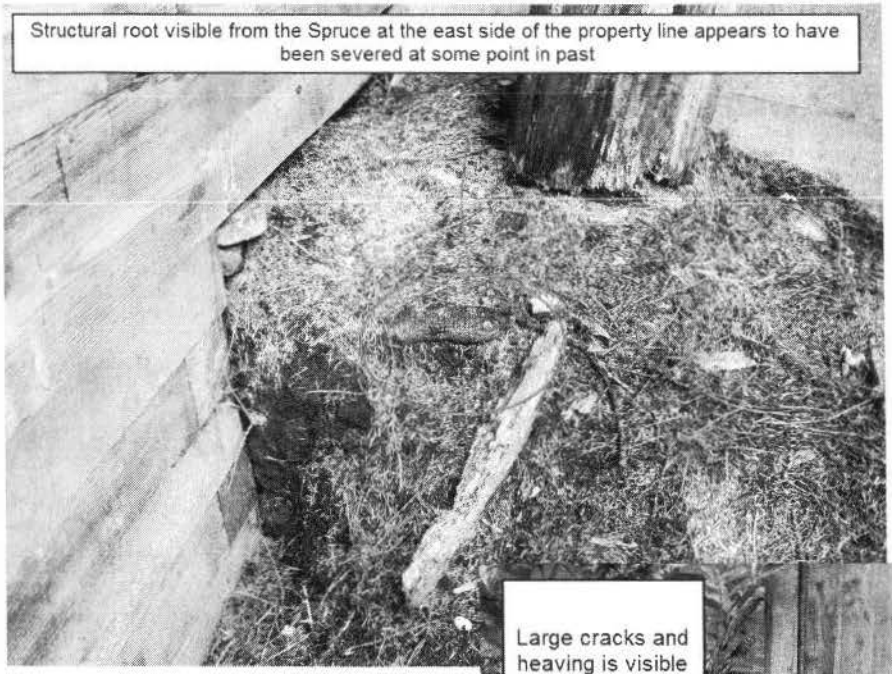
These trees are considered to have a high live crown ratio and moderate trunk taper. *Live Crown Ratio* is defined as the ratio of the vertical extent of the live crown, compared to the overall height of the tree. Tapered trunks will withstand greater stress (*wind, vandals, snow load etc*) than those that have little to no taper. Tapered trunks also allow for a more uniform distribution of the stress that will be imposed on the tree. The taper in a tree trunk decreases in diameter the higher up the tree you go. Mechanically the tops of well-tapered trunks are more apt to bend under the wind further from the vertical than those with less taper. This reduces the danger of broken trunks or other deformation from exposure to the heavy winds.

Picture 4. Previous topping point - Cedar

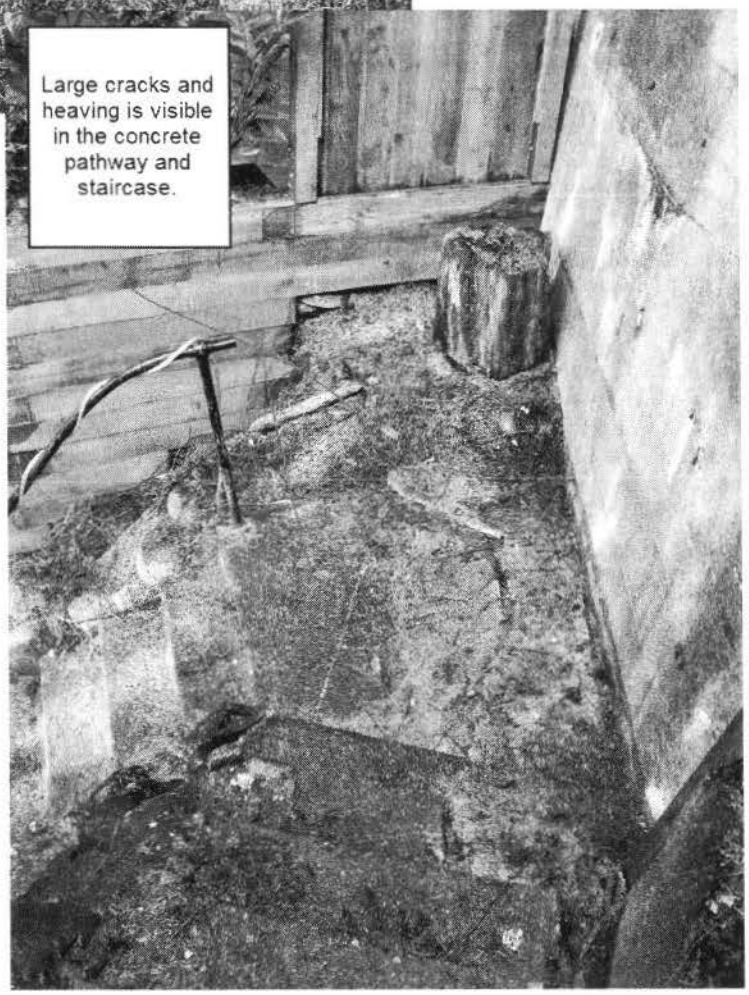
Picture 5. Bulge visible in Cedar trunk



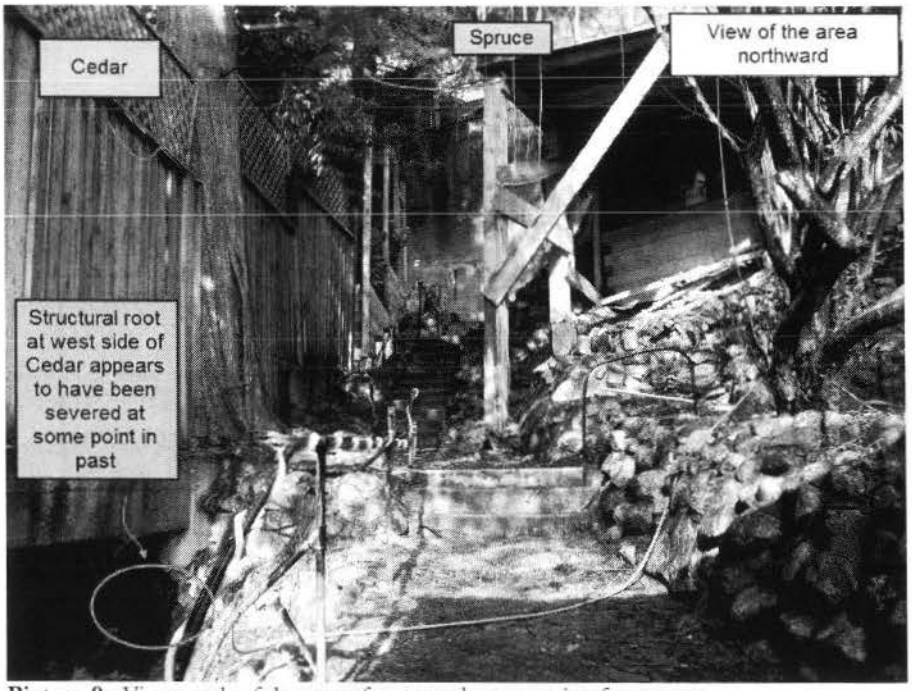
Picture 6. Base of Spruce



Picture 7. Structural roots visible



Picture 8. Cracks and heaving in concrete near trees



Picture 9. View north of the area of proposed construction for carport

These trees appear to be in overall good health. However, the Western Red Cedar is showing some indication of stress. For example, the canopy density is somewhat thinner than the others in the immediate area and as well minor signs of chlorosis are evident. *Chlorosis* is a condition in which leaves produce insufficient chlorophyll. Chlorophyll is responsible for absorbing light energy in plants and therefore, is responsible for the green colour in a leaf. Chlorotic leaves are generally pale or yellow.

The trees are exhibiting a moderate cone crop within the canopy. There are no visible fungal conks or outward signs of root decay. There is no apparent indication of shifting or heaving in the root plate at the time the site visit was conducted.

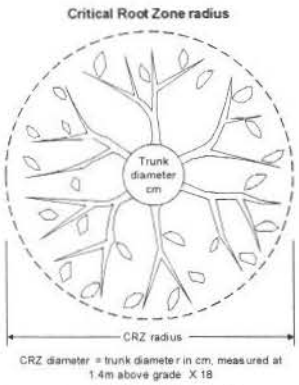
BACKGROUND OF APPROACH

A tree's decline and mortality on construction sites results primarily from damage to the root system. During construction, roots are frequently cut when installing foundations, water, sewer lines or other utilities, driveways, curbs, sidewalks etc. Many roots are also lost when soil is removed during grading. Fine absorbing roots occur primarily within the top 6 to 8 inches of soil. Removing just a few inches of soil during grading can result in the elimination of many of these roots. Loss of fine roots will reduce water and nutrient absorption which will eventually lead to decline. Cutting larger roots could compromise stability and increase the probability of failure.

Compaction of the soil or placing fill over a tree root system during grading is equally as destructive. All plant cells, including those in the roots, require oxygen to survive. Root cells obtain oxygen from the pores space in the soil. When the soil over the root systems is compacted, or fill soil is added during construction, the amount of soil air is greatly reduced. At the same time, gases

toxic to plant roots tend to accumulate in the soil. These adverse factors result in root mortality and tree decline.

Mechanical injuries to the stems and limbs also contribute to tree decline. Bark injuries inhibit transport of water and nutrients to the crown and allow entrance of decay and other disease organisms. Storing of supplies and materials within the root zone and soil contamination due to spills of materials such as fuel etc will also damage the root system

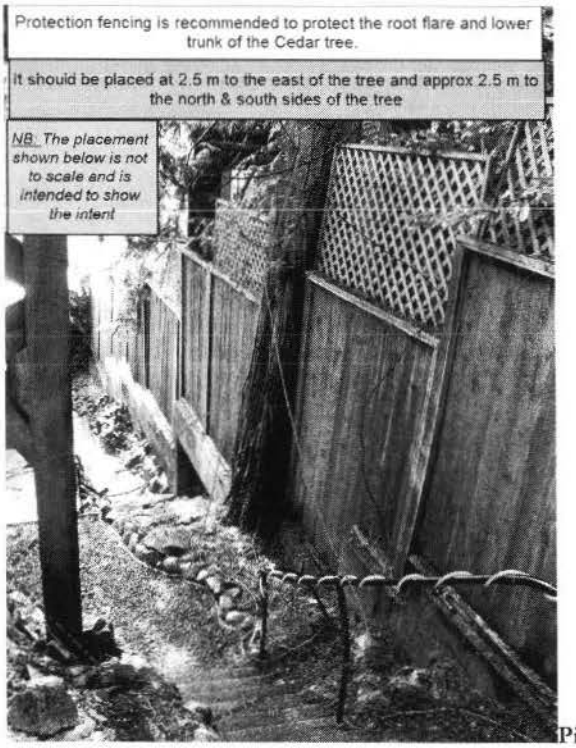


The Critical Root Zone (CRZ) is the area of soil around the tree where the majority of the roots are located. The roots within this area provide stability and are responsible for the uptake of water and nutrients to maintain tree health. Any level of compaction limits root growth due to lack of available oxygen.

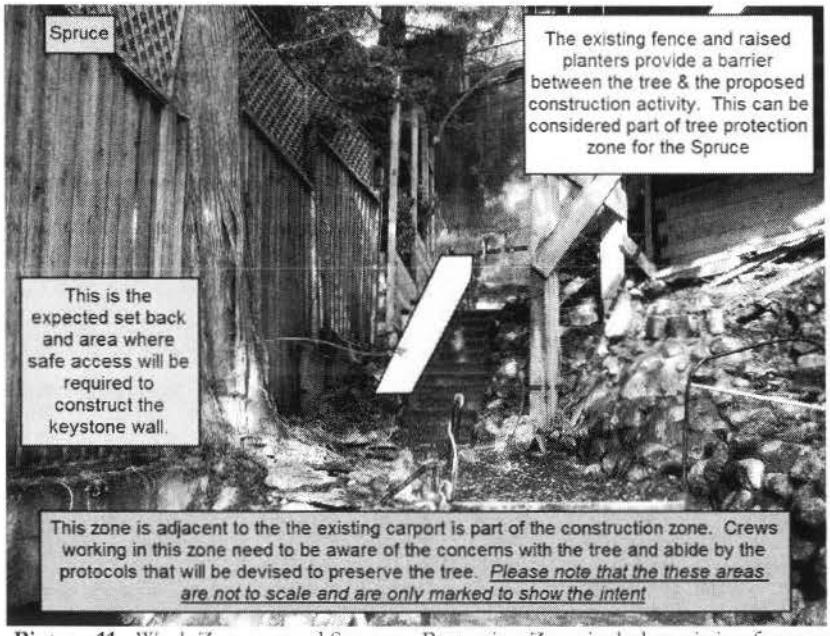
The stress of compaction and low soil fertility, coupled with other physical, environmental and human forces acting against the trees, it is reasonable to expect that the Critical Root Zone of these trees will be impacted, to some degree, due to the proposed construction activity. Providing protection for the trees is recommended to reduce the overall impact to the trees and their root system as well as providing some alternatives for the construction may be required to allow the construction to be built to specification as well as to preserve the trees.

RECOMMENDATIONS:

1. For the purposes of constructing the carport exploratory excavation is strongly recommended by use of an Air Spade® or like equipment. The intent of the exploratory excavation will be to determine the extent of the trees' roots and to determine where the structural roots extend to at the east side. An *AirSpade®* is an air excavation tool that when attached to a compressor uses a high velocity of air to blow soils away from roots without damaging them. This is a widely used tool within the arboriculture and horticulture communities as well as within utility & construction, environmental remediation, trench rescues and demining/unexploded ordnance. The excavation, and any subsequent root pruning, is to be conducted by or under the direct supervision/instruction of a Qualified Certified Arborist.
2. Tree protection will be required to protect the trunks and root flares of these trees. Acknowledging that the site has its limitations and the importance of maintaining a traffic flow for construction worker safety, adaptations to the tree protection zones will be required. A tree protection zone should be constructed to delineate a zone around the trees with fencing to prevent encroachment of equipment as well as prevent items from being stored up against the trees and as well, using the existing fencing and raised planters. The fencing could be constructed out of wooden framed orange ploy fencing for this application. Signage should be placed on the fencing to convey to workers the purpose for the fence. It is to remain in place for the duration of the construction activities until there is no further possibility that the trunk and root flares will be damaged. No construction activities should occur within the CRZ of any tree however as this site poses unique challenges adaptations are reasonable and required.



Picture 10. Tree Protection Zone - Cedar



Picture 11. Work Zone around Spruce – Protection Zone includes existing fence and planter

3. If encroachment is required into a Tree Protection Zone for footings or pillars, it is recommended to conduct the excavation for the footings by using an Air Spade® or like equipment, such as a HydroVac, to ensure that the footings will be positioned beside or

nearby to a root but not directly on the location of any structural roots. A Qualified Certified Arborist **must be** on-site during the periods of excavation that fall within the CRZ of the trees to observe, assess and ensure the integrity of the CRZ is maintained and conduct any subsequent root pruning (if required).

4. Adaptations to the base of the construction of the Keystone wall are proposed and it is recommended to use some type of structural support, such as pillars on footings to erect the wall ensuring that it follows engineered specifications. Using a system such as this will minimize the overall impact to the CRZ of the trees because the area of excavation will be limited to the location of the footings and also this will minimize the need for excessive pruning of the roots to accommodate the proper construction of the wall. It is plausible to utilize this area however all parties must keep in mind that the goal is to have little to no impact to root zones of these trees to ensure their preservation. Impact could include excavating, stock piling soil, damage to surface roots etc, therefore, ***all work conducted within the CRZ is to be done with care and awareness***. Any excavation for the footings should be minimal, isolated to the area of the footing and executed by using an AirSpade® or like equipment. If aggregate or fill is required to be placed beneath the footings to ensure the structures stability, it is recommended to use a medium that maintains pore space for the roots, drains freely and provides stability for the footings, for example, a medium that compacts as hard as 'road base' is not suitable; and or securing the footings to the bedrock. If the protection fencing or a portion thereof requires moving or removing while the construction activities for the footings are being executed, this should be considered temporary and the panels must be replaced and secured at the end of each day until there is no further possibility of damage to the CRZ from any construction activities.
5. Using support beams on a footing or a grade beam for the base of the keystone wall may be reasonable options to consider avoiding the severing of any roots. A *grade beam* is an engineered reinforced concrete beam placed directly on the ground to provide the foundation of a structure.
6. It is recommended to maintain the existing grade within the CRZ. Changing the grade around these trees proposed for retention could possibly change the water table and the sites drainage creating other problems such as standing water, anaerobic soil conditions and or root rot etc. It would be discouraged to change the grade by importing fill to level out certain areas.
7. There is a natural slope on this property and it is recommended to use perforated pipes for any drainage applications to still allow for water to be able to penetrate to some degree into the surrounding soil. Solid pipes will collect and drain away water from the site without depositing any into the soil before reaching the creek. The intent of this is to avoid potentially changes in soil hydrology.
8. If installation of any utilities, or pipes required for drainage, electricity, irrigation etc, are to be installed within, or cross sect the CRZ, then it is recommended to reconsider their placement. If this is not plausible, then items like these must be installed by tunneling beneath the roots by using an Air Spade® or like equipment to ensure that no further damage to the structural roots is incurred during their installation as well as attempting to maintain as many of the remaining viable feeder roots as possible.
9. A soil analysis and sub-surface prescription fertilizer application to maintain soil fertility and the trees' overall health, **before, during & after construction**, is strongly recommended. Trees are often highly impacted by disruption within their CRZ due to construction activities

thus implementing a prescription fertilizer program to help bolster the trees' health and natural defenses is strongly recommended if the intent is to preserve the trees. As well there may be a potential health concern with the concrete (lime) leaching from the new concrete building materials into the root zones of the trees and any of new plants or trees once the site is re-landscape. This can be addressed by implementing an ongoing plant health care regime that includes composting and or mulching and soil sampling coupled with sub-surface prescription fertilization.

10. Root pruning may be required to complete any of the exploratory work. The work is to be conducted by or under the direct supervision/instruction of a Qualified Certified Arborist.
11. Removing the existing concrete must be done with extreme care and attention. It is reasonable to expect that due to the length of time that the trees have been growing in close proximity to these hard surfaces, the trees' roots may have embedded themselves in the underside of the concrete slabs. Using a jack hammer (manually or as an attachment on a small piece of equipment) to break up the concrete and carefully remove it from the area to ensure that any of structural or feeder roots that have found their way beneath the existing slabs are not damaged by breakage or tearing. Thus, the foundation and the roots may need to be "teased" apart. **Do Not Use small excavating equipment with a toothed bucket attachment to break up and collect the concrete.**
12. Back filling for the proposed carport construction with structural soil is recommended. *Structural Soil* is a medium that can be compacted to pavement design and installation requirements while permitting root growth. It is a mixture of gap-graded gravels (made of crushed stone), clay loam, and a hydro-gel stabilizing agent to keep the mixture from separating. It provides an integrated, root penetrable, high strength pavement system that is conducive to both the structure and the trees.
13. It is recommended that the surfacing selected for use on the pathways or within the proposed parking area where it may be exposed to rainfall, as per the plans provided, should be constructed of a permeable and flexible material, for example, paving stones or like material, to allow for water penetration instead of just running off of the hard surfaces.
14. It is recommended to conduct some soil remediation (mixing in organic matter) and compaction relief within the root zone post construction and prior to any landscape installation. Use of an Air Spade® or like equipment to ensure that there is minimal root damage in the critical root zone during the aeration process is strongly recommended. Mulching up to 2 – 3 inches in depth to improve overall tree health is recommended. Aerating the surrounding soil around the trees with the use of the Air Spade®, post construction, will reduce some of the potential for damage and stress that can be caused by the compaction of the roots. Amending the soil with organic matter will improve the soil aeration and create more conducive conditions to help counteract the impact on the root system. This will, in turn, improve the overall health and longevity of the trees as well as promote a healthy landscape.
15. If the construction work is to occur during any drought periods, for example, summer time, then thorough watering of the trees to keep the soil moistened is strongly recommended. Supplemental irrigation during dry periods is necessary because any root loss will reduce the water absorption capability of the trees. Water should be applied heavily at weekly intervals during droughts. Applying water through soaker hoses placed under the drip line overnight will usually provide sufficient irrigation. ***This could be completed during non-construction-work hours***. Ensuring that the trees are adequately watered through this

period will help reduce the impact of the stress being imposed on the trees during the construction activities.

16. Pruning to raise the canopies of these two trees slightly to provide clearance to the new structure is reasonable. Written permission must be obtained by the neighbour at 2666 Panorama Drive prior to any pruning work commencing. This consent is also required to grant entry to the neighbouring property for the tree care service to be able to conduct the work. As well, approval by the DNV in the form of a permit is required. This work is to be conducted by or under the direct supervision/instruction of a Qualified Certified Arborist.
17. Monitoring the trees during & post construction is to be executed by a Qualified Certified Arborist to ensure that all aspects of their preservation are being adhered to & properly addressed.
18. No vehicles, equipment or construction materials or like items are to be stored within the CRZ of these trees.
19. **Turf is not recommended** to be installed as part of the landscape within the root zone of any tree.

CONCLUSION:

In conclusion, this is a unique property. It is narrow and long and is slopes towards the ocean front. There are limitations or challenges that will be expected for this site during construction. It is important to note that it is much easier to adapt construction practices to mature existing trees, than it is to adapt the trees to the construction. The recommendations in this report have been made based on the site findings and may be subject to change based on any information that arises or is uncovered after this report is submitted.

These trees fall within close proximity to the proposed construction activities. Conducting some preliminary exploratory excavation with an AirSpade® or like equipment is strongly recommended to establish reasonable protocols for the carport construction on this site. A Qualified Certified Arborist should be on site during periods where the construction activities fall within or are in close proximity to these trees to monitor and ensure that there is no damage or risk imposed on these trees if the objective is to retain them and to promote their overall long term preservation.

Care must taken when working around these large mature trees. In order to preserve large trees like these ones on or near a construction site, it is important to understand that mature trees are much less adaptable to site changes that occur during or are associated with construction. Construction activities should be limited within the root zone of any tree however if construction activities do occur near established trees without following accepted protocols, this increases the probability of failure due to the disruption or loss of structural roots. Constructing a tree protection zone made of wooden frame and orange poly fencing will be an effective way to achieve the protection of the CRZ from the heavy construction activities, as well as incorporating the existing fencing and raised planters. The fencing should remain in place for the duration of the construction until there is no further possibility of damage.

The objective on this project should be to achieve the construction as per the specifications without severing or damaging any of the roots. Because the tree roots for both trees are extending primarily into the east side of the property line, ***all parties must*** keep in focus that the goal is to

minimize the overall impact of the construction activities on these trees. Thus, any work or activities conducted during the construction and surrounding area ***must be*** done with the overall long term preservation of the trees in mind as it is intended to retain them. Conducting a soil analysis and implementing a prescription fertilizer program will assist in promoting improved and optimal health, maintain the vitality of the trees and reduce the stress imposed by the construction.

It is important to note that there are many different factors causing stress to trees. For example, imposed stress could be things such as environmental factors like climate change to cultural conditions such as soil compaction or mechanical damage to the roots, but it is likely to be a combination of factors. Trees play an important role in the urban ecology, and all of us must be stewards to ensure a tree's survival and our own safety.

Testing and Analysis:

The assessment completed on the trees defined within this report, consisted of a visual and physical inspection from the ground and was based upon the principals of Visual Tree Assessments. No invasive tests, such as using a resistograph or increment borer, where used during the testing for this report.

Assumptions and Limiting Conditions:

1. The information contained in this report covers only those items that were examined and reflect the condition of these items at the time of inspection. The inspection is limited to visual examination of accessible components without dissection, excavation or probing. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the trees or property in question may not arise in the future.
2. The opinions in this Report are given based upon observations made using generally accepted professional judgment, however, because trees and plants are living organisms and subject to change, damage and disease, the results, observations, recommendations, and analysis as set out in this Report are valid only as at the date any such testing, observations and analysis took place. No guarantee, warranty, representation or opinion is offered or made by Radix Tree and Landscape Consulting as to the length of the validity of the results, observations, recommendations and analysis contained within this Report.
3. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the appraiser/company can neither guarantee nor be responsible for the accuracy of information provided by others.
4. All tree work is to be completed under the supervision of an ISA Certified Arborist and in compliance with ISA, BC Hydro and WCB standards.
5. Alteration of any part of this report invalidates the entire report.

If you have any questions or concerns please feel free to contact me.

Sincerely yours,

Michelle McEwen

Michelle McEwen
ISA Certified Arborist (PN-6707A)
ISA Certified Tree Risk Assessor (544)
CofQ #00317-LH-08
Certified Horticulturist

ATTACHMENT 7611 J

PHOENIX
ENVIRONMENTAL SERVICES LTD. 312 - 750 TERMINAL AVE. VANCOUVER, BC V6A 2M5 604-689-3888 fax: 689-3880

January 10, 2011

Mr. Richard Boase
Environmental Coordinator
District of North Vancouver
355 West Queens Road
North Vancouver V7N 4N5

Dear Mr. Boase:

Re: Redevelopment of Residential Lot, 2672 Panorama Drive, North Vancouver
Environmental Assessment – Streamside Development Protection DP

Phoenix Environmental Services Ltd. has completed this environmental impact assessment of the conceptual plans for replacement of the existing house with a new residence at 2672 Panorama Drive, in partial fulfillment of the requirements for an Aquatic Area Permit from the District of North Vancouver. Based on the District's bylaws, the property falls within a Streamside Protection Development Permit Area due to the presence of a watercourse along the western property line. This environmental impact assessment describes the existing conditions of the site, addresses the potential impacts to the stream by the proposed redevelopment, and recommends mitigation measures.

Project Description

The subject lot is 35.32 feet (10.77 m) wide and extends from Panorama Drive (to the north) to the natural boundary of Deep Cove (to the south). Please refer to the attached site plan: Watercourse Setback Map.

Existing structures on the site include the driveway, a wood frame garage, concrete steps and patios from the garage down the slope to a two storey wood frame house, and concrete patios. Along the west side of the property is an unnamed watercourse within a concrete and rock flume, which emerges from the neighbouring property (to the west) under a concrete beam fence line. Extensive revetment with concrete has been made to the natural channel using concrete and boulders. There is no riparian vegetation between the existing house and the stream. A few shrubs are located at the very south end of the site, near Deep Cove (see site photos, attached).

The watercourse is a first order stream (i.e. no tributaries or confluences with other streams) that originates approximately 1,860 meters upstream. The stream grade is 25-30% from 525 meters above sea level to Deep Cove. Based on GeoWeb (online mapping from the District of North Vancouver), the stream originates uphill of Mt. Seymore Parkway, passes through Cove Forest, and then crosses 6 residential lots before reaching Deep Cove. The watercourse through the property is steep (~25% slope) and is completely confined within a concrete and cemented-boulder channel until its confluence with the higher high water mark (HHWM) of Deep Cove.

Streamside Protection Development Permit Area (DPA)

The DPA guidelines require a 15 meter (49' 3") setback from the top of bank for any lot under 0.5 hectares, which applies to this site. Redevelopment is permitted as long as the proposed plan does not encroach further into the Streamside Protection Area than existing structures. A setback of 7.62 meters (25 feet) from the natural boundary of Deep Cove is also required.

Potential Environmental Impacts

The site currently has no valuable riparian vegetation other than a handful of shrubs and trees at the south end of the property, near the natural boundary of Deep Cove. Restoration of the watercourse to a natural stream configuration is not practical on the site due to the confinement of the stream, the gradient, the existing concrete fortification of the former natural channel and steep banks, and the proximity of existing structures.

The proposed house footprint will be roughly equivalent to the existing house footprint. The foundation wall along the stream (west side) will be retained and used as shoring for the new foundation, which will be built against the interior wall. New foundations will be built for the remainder of the proposed house.

Overall, both the existing and proposed house encroaches into the DP setback area, which is unavoidable as the 15-m setback extends beyond the subject property into the adjacent property. However, none of the proposed new footprint extends beyond the surveyed top of bank, as shown on the attached Watercourse Setback map. The projection of the proposed house southward and northward will be over existing impervious surfaces, and therefore does not impose any additional environmental impacts.

Proposed Restoration Areas

A selection of native shrubs will be planted at the southern end of the watercourse where the banks are comprised of soil and rock, rather than concrete. A restoration planting plan will be completed showing low growing trees (e.g. willow) and shrubs (e.g. snowberry) arched toward the stream channel to provide overhanging riparian vegetation, as shown shaded in green stipple on the attached Watercourse Setback Map.

Conclusions

The proposed new house at 2672 Panorama Drive cannot possibly meet the applicable 15 m setback under the Streamside Development Protection DP; nor can or have adjoining residential narrow lots. The lot adjacent to the west has been recently redeveloped, as have numerous others in the neighbourhood. Many adjacent properties have floats and boot moorage extending into the marine foreshore.

There is no additional environmental impact associated with the proposed new house. There is opportunity to plant overhanging streamside vegetation in the lower section of the stream to provide habitat enhancement.

Please contact me at 604-689-3888 if you require any clarification or additional information concerning this environmental assessment report.

Sincerely,
Phoenix Environmental Services Ltd.

Ken Lambertsen, B.Sc., R.P.Bio.
Principal

GEOweb
The District of North Vancouver
GIS Department
p: 604.990.2311
e: gis@dnv.org
w: www.geoweb.dnv.org

2672 Airphoto

NORTH VANCOUVER DISTRICT

Printed on: Mon Jan 10 2011

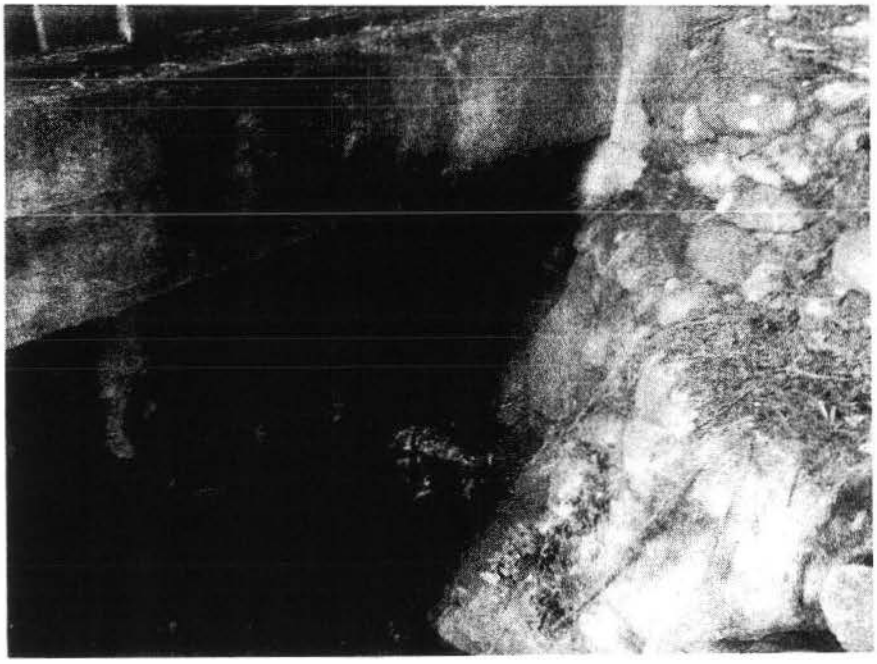


Photo # 1: North end of stream, entering the property via a concrete flume under fence.

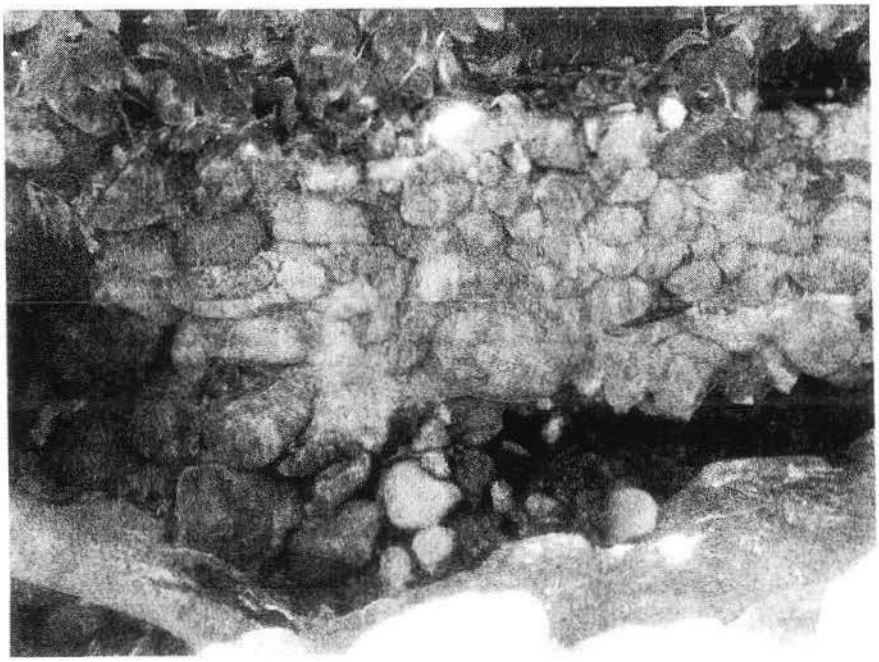


Photo # 2: Concrete and boulder retaining wall/channel adjacent to existing house with laurel hedge on opposite bank.

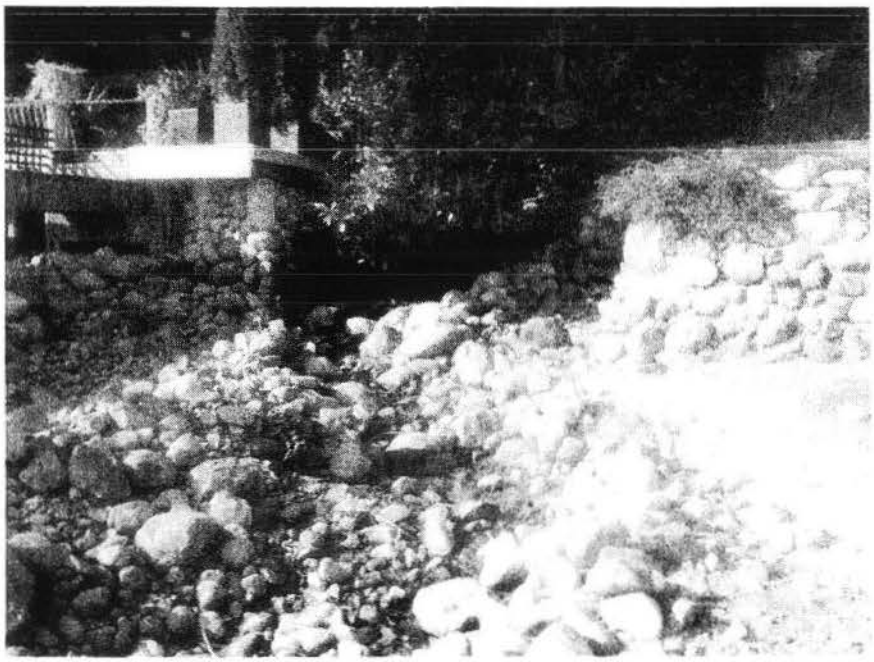
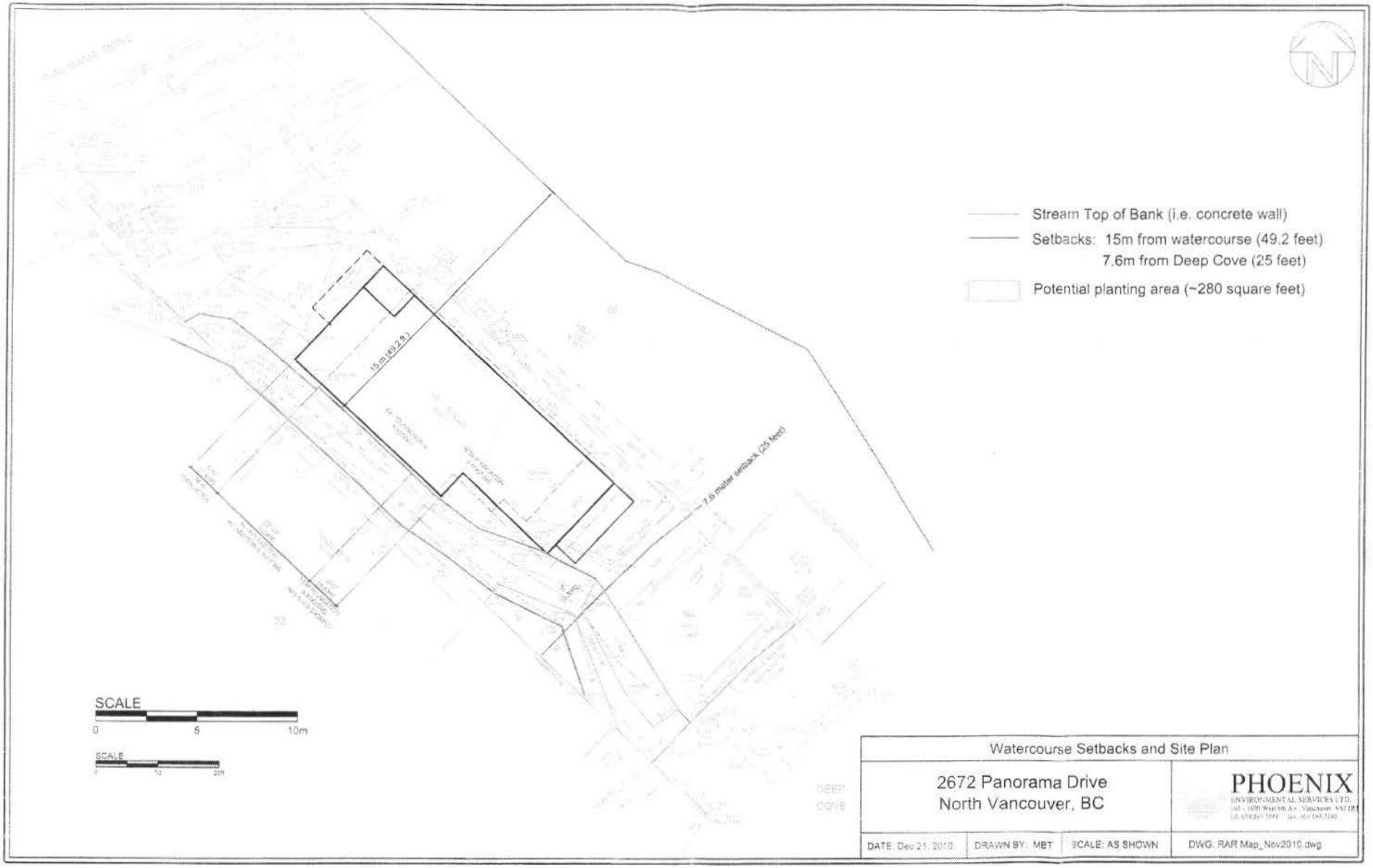


Photo # 3: Outfall of stream to Deep Cove (view toward the property, house visible at top right).


Stream Top of Bank (i.e. concrete wall)
Setbacks: 15m from watercourse (49.2 feet)
7.6m from Deep Cove (25 feet)
Potential planting area (~280 square feet)
15 m (49.2 ft.)
7.6 meter setback (25 feet)
SCALE
0
5
10m
SCALE
Watercourse Setbacks and Site Plan
2672 Panorama Drive
North Vancouver, BC
PHOENIX
ENVIRONMENTAL SERVICES LTD.
DATE: Dec 21, 2010
DRAWN BY: MBT
SCALE: AS SHOWN
DWG: RAR Map_Nov2010.dwg

ATTACHMENT 76.11K.

PHOENIX
ENVIRONMENTAL SERVICES LTD. 312 – 750 TERMINAL AVE. VANCOUVER, BC V6A 2M5 604-689-3888 fax: 689-3880

October 3, 2011

Ms. Erika Nassichuk
District of North Vancouver
355 West Queens Road
North Vancouver V7N 4N5

Dear Ms. Nassichuk:

Re: Redevelopment of Residential Lot, 2672 Panorama Drive, North Vancouver
Environmental Assessment – Streamside Development Protection DP

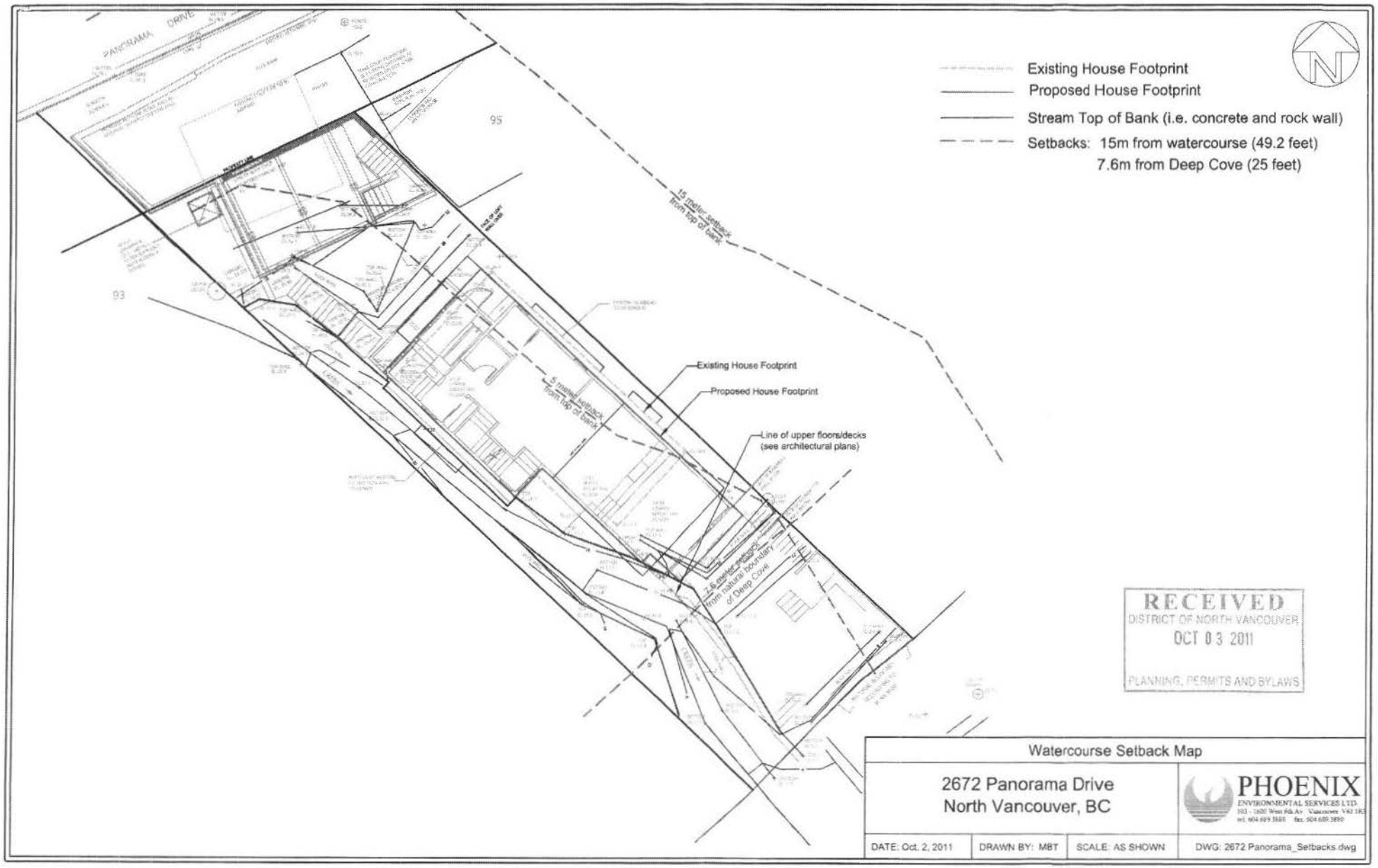
Please find enclosed the additional information requested for the property referenced above. Included in this package is a revised watercourse setbacks map showing both the 5 meter and 15 meter setback from the top of bank, a revised habitat balance map with the current site plan encroachments and restoration areas, and a detailed restoration plan.

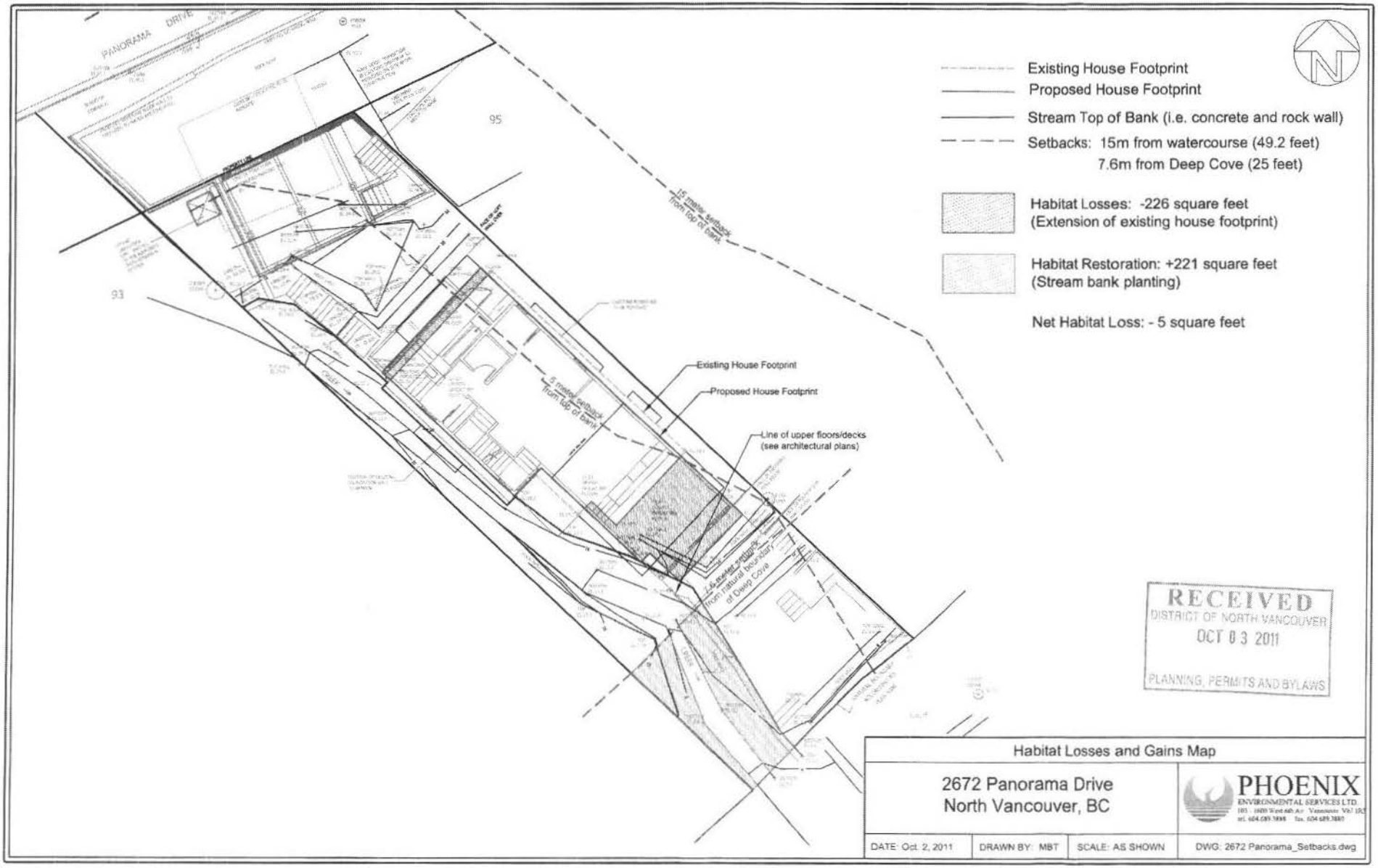
Regarding the potential opportunities for restoration on the site, a majority of the watercourse is constricted in a concrete channel between house foundations on the subject site and the adjacent property to the south/west. These foundations limit the restoration opportunities for the watercourse along the south property line. The best potential for effective restoration benefits is at the southeast corner of the site beyond the proposed house footprint, where the watercourse meets Deep Cove. The proposed restoration will restructure the existing rock wall to allow for the addition of planting medium and streamside planting of native species tolerant of ocean side conditions.

Please contact me at 604-689-3888 if you require any clarification or additional information concerning this environmental assessment report.

Sincerely,
Phoenix Environmental Services Ltd.

Ken Lambertsen, B.Sc., R.P.Bio.
Principal


PANORAMA DRIVE
95
93
15 meter setback from top of bank
5 metre setback from top of bank
Existing House Footprint
Proposed House Footprint
Line of upper floors/decks (see architectural plans)
7.6 metre setback from natural boundary of Deep Cove
Existing House Footprint
Proposed House Footprint
Stream Top of Bank (i.e. concrete and rock wall)
Setbacks: 15m from watercourse (49.2 feet)
7.6m from Deep Cove (25 feet)
RECEIVED
DISTRICT OF NORTH VANCOUVER
OCT 03 2011
PLANNING, PERMITS AND BYLAWS
Watercourse Setback Map
2672 Panorama Drive
North Vancouver, BC
PHOENIX
ENVIRONMENTAL SERVICES LTD.
DATE: Oct. 2, 2011
DRAWN BY: MBT
SCALE: AS SHOWN
DWG: 2672 Panorama_Setbacks.dwg


PANORAMA DRIVE
95
93
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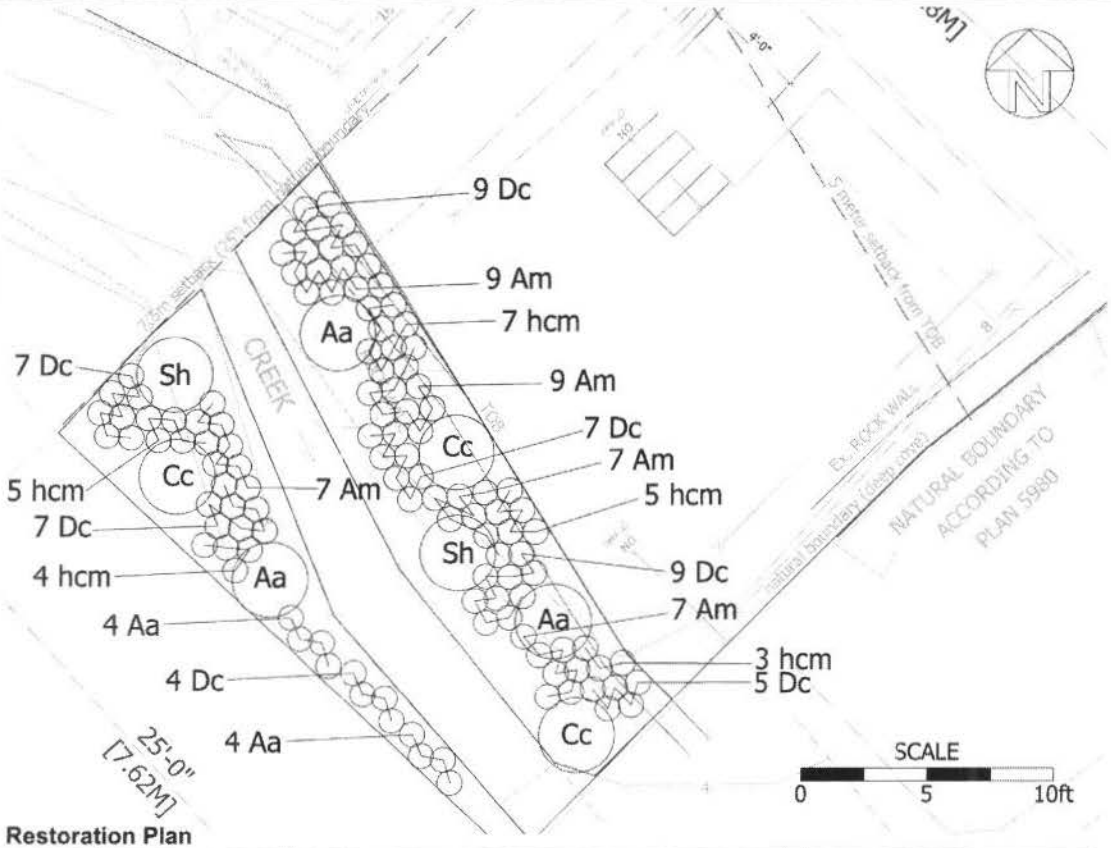
Existing House Footprint
Proposed House Footprint
Line of upper floors/decks (see architectural plans)
15 metre setback from natural boundary of Deep Cove
Existing House Footprint
Proposed House Footprint
Stream Top of Bank (i.e. concrete and rock wall)
Setbacks: 15m from watercourse (49.2 feet)
7.6m from Deep Cove (25 feet)
Habitat Losses: -226 square feet
(Extension of existing house footprint)
Habitat Restoration: +221 square feet
(Stream bank planting)
Net Habitat Loss: - 5 square feet
RECEIVED
DISTRICT OF NORTH VANCOUVER
OCT 03 2011
PLANNING, PERMITS AND BYLAWS
Habitat Losses and Gains Map
2672 Panorama Drive
North Vancouver, BC
PHOENIX
ENVIRONMENTAL SERVICES LTD
DATE: Oct. 2, 2011
DRAWN BY: MBT
SCALE: AS SHOWN
DWG: 2672 Panorama_Setbacks.dwg



Restoration Plan
scale as shown

Plant Schedule

	Symbol	Qty	Botanical Name	Common Name	Size
TREES & LARGE SHRUBS	Sh	2	*Salix hookeriana*	Hooker's Willow	#2 pot
	Aa	2	*Amelanchier alnifolia*	Serviceberry	#5 pot
	Cc	2	*Corylus cornuta var. californica*	Beaked Hazelnut	#5 pot

	Symbol	Qty	Botanical Name	Common Name	
SMALL SHRUBS & HERBS	Dc	48	*Deschampsia cespitosa*	Tufted Hairgrass	1 gallon
	hcm	24	*Sidalcea hendersonii*	Henderson's checker mallow	1 gallon
	Am	48	*Armeria meritima*	Thrift / Seapink	1 gallon

——— Stream Top of Bank (i.e. concrete wall)
– – – Setbacks: 5 m / 15 m from watercourse (49.2 feet)
7.6m from Deep Cove (25 feet)

Restoration Description and Notes:
The existing condition of the creek within the site is a concrete channel flanked by house foundations or concrete/rock walls on either side. These structures are required to ensure the structural integrity of the residences on both sides of the creek. Restoration is proposed for the portion of the creek between the house foundation and the natural boundary of Deep Cove, as shown on this plan. The restoration will include the following creek and shoreline restoration measures:

1. Existing boulders on the creek banks will be restructured by hand to allow for placement of planting medium in the void spaces for restoration planting into the banks. Existing non-native vegetation in poor condition may be removed and replaced with native species. The restoration work will provide new overhanging vegetation and will enhance the food and nutrients in the stream channel and shoreline.

2. Planting medium must meet the requirements of the BC Landscape Standard, 7th Edition, for Level 3 "Moderate" Areas (Table 6-3).

3. All plant material must meet the requirements of the Canadian Standards for Nursery Stock and the BC Landscape Standard, 7th Edition, Section 9.2 with special attention to Section 9.2.4 Native Plants. Any substitutions must be approved by the environmental consultant/restoration designer (Phoenix Environmental).

4. All construction work within the top of bank of the creek shall be done in dry conditions during the in-stream works window. If flow is present, a pump-around system must be used to divert water around the work area. No water with sediments, concrete wash, or other contaminants shall be discharged to the creek or Deep Cove. An on-site treatment system such as Stormguard (or equivalent) will likely be required. An erosion and sediment control plan should be prepared to address management of site runoff and protection of water bodies during construction activities.

5. Planting may be done at any time of year, but plant survival is greatest if planting occurs in the fall. Temporary irrigation will be necessary to ensure survival of the restoration planting during the first 2 summers until the plants are established.

6. All plant material must meet the requirements of the BC Landscape Standard, 7th Edition.

Habitat Restoration Plan

2672 Panorama Drive
North Vancouver, BC

PHOENIX ENVIRONMENTAL SERVICES LTD.

DATE: Sept. 27, 2011	DRAWN BY: MBT	SCALE: AS SHOWN	DWG: 2672 Pano_Restoration.dwg

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COUNCIL AGENDA/INFORMATION				
☐ In Camera	Date:		Item #	
☐ Regular	Date:		Item #	
☑ Agenda Addendum	Date:	July 23, 2012	Item#	8.9
☐ Info Package	DM#	Date:	Mailbox:	

Dept. Manager	Director	CAO
BSD		

The District of North Vancouver
REPORT TO COUNCIL

July 19, 2012
File: 3060-20-40.12
Tracking Number: RCA -

AUTHOR: Steven Petersson, Development Planner

SUBJECT: **280 Lloyd Avenue (Grant Connell Tennis Centre)**
Revised Development Permit 40.12

RECOMMENDATION:

That Council issue Development Permit 40.12 for a three-court expansion to the Grant Connell Tennis Centre as revised and attached to the agenda addendum report prepared by the Development Planner dated July 19, 2012.

REASON FOR REPORT:

The purpose of this report is to include the most current Arborist Assessment and direction on replacement tree planting in Development Permit 40.12.

SUMMARY:

Development Permit 40.12 was originally submitted with excerpts from an Arborist Assessment dated May 17, 2012. This updated Development Permit includes excerpts from the May 28, 2012 Arborist Report attached to the Development Permit as Appendix 40.12l.

Section 3(iii) was added to the Development Permit to provide greater clarity on planting replacement trees.

Conclusion:

The proposed amendments are recommended to include the most current Arborist Assessment and provide clarity on planting replacement trees.

Steven B Petersson

Steven Petersson, MCIP RPP
Development Planner

Attachment A – Revised Development Permit 40.12

REVIEWED WITH:	REVIEWED WITH:	REVIEWED WITH:	REVIEWED WITH:
❑ Sustainable Community Development	❑ Clerk's Office	External Agencies:	Advisory Committees:
❑ Development Services	❑ Corporate Services	❑ Library Board	❑ _____
❑ Utilities	❑ Communications	❑ NS Health	❑ _____
❑ Engineering Operations	❑ Finance	❑ RCMP	❑ _____
❑ Parks & Environment	❑ Fire Services	❑ Recreation Commission	
❑ Economic Development	❑ Human resources	❑ Other: _____	
	❑ ITS		
	❑ Solicitor		
	❑ GIS		

THE CORPORATION OF THE DISTRICT OF NORTH VANCOUVER

DEVELOPMENT PERMIT 40.12

This Development Permit 40.12 is hereby issued by the Council for The District of North Vancouver to The District of North Vancouver to allow for construction of a three-court expansion to the Grant Connell Tennis Centre on the parcel at 280 Lloyd Avenue, described as:

Lot A, Blocks 12, 13 and 20, District Lot 266, Plan 21750 (PID: 011-091-495)

subject to the following terms and conditions:

A. The following requirement is hereby imposed under subsection 926(1) of the Local Government Act:

1. Substantial construction shall commence within two years of the date of this permit, as determined by the Manager of Permits and Licenses, or the permit shall lapse.

B. The following requirement is hereby imposed under subsections 919.1 (a), (b), (h), (i) and (j), and 920 (1), (2), (7), (7.1), (10.1), (10.2) and (11) of the Local Government Act:

1. The site shall be developed generally in accordance with the attached landscape and building plans and geotechnical and environmental reports (Appendices 40.12a to 40.12p), as may be amended at the Building Permit stage to comply with the final engineering and landscaping plans.

2. No work shall take place within the riparian Protected Area as identified on the attached plans except to the limited extent shown on the attached plans and specifications:

   i. Building plans, as prepared by Shape Architecture and described as "Grant Connell Tennis Centre Expansion", including sheets A1.01, A2.01, A3.01, A3.02, A3.03, C2, C3, L0.01, L3.01, L6.01, dated May and July, 2012;

   ii. Environmental Habitat Assessment, as prepared by Keystone Environmental, as described as "Grant Connell Tennis Court Expansion Amended Habitat Assessment", dated March 14, 2012 and amended to include "Raptor and Great Blue Heron Nesting Survey", dated May 14, 2012;

iii. Habitat Compensation Restoration Plan, as prepared by Shape Architecture and described as " Planting Plan", including sheet L3.01, dated May 23, 2012;

iv. Legal Survey, as prepared by Bennet Land Surveying Ltd, for Part of Lot A, Blocks 12, 13 and 20, District Lot 266, G.1, NWD, Plan 21750, date of certification May 14th, 2012.

3. For greater certainty:
   i. No other buildings, structures, paving or other impervious surfaces or alteration of land shall be constructed within the Protected Area as outlined on the attached plans, except as exempted by Schedule B, Section 2.3 (Streamside Protection Development Permit Area Guidelines) of the District of North Vancouver Official Community Plan;

   ii. No trees or other vegetation shall be disturbed or removed from the riparian Protected Area identified on the attached plans, except as noted in the "Amended Arborist Assessment", prepared by Keystone Environmental, dated May 28, 2012;

   iii. Replacement trees shall be planted according to direction provided in the "Amended Arborist Assessment", prepared by Keystone Environmental, dated May 28, 2012;

   iv. No material of any kind, including construction and demolition debris, grass clippings, compost material or other waste be placed within the Protected Area;

   v. Prior to disturbance of the site, the development footprint shall be isolated with exclusion fencing. Small mammal trapping shall be conducted for Pacific water shrews. Trapped animals shall be relocated outside of the construction zone.

4. New riparian planting is required as compensation for the 37m^2 disturbed area within the Protected Area. New riparian planting will be a minimum planted area of 397 m^2, to be planted with native species in accordance with the attached plan and plant list, described as "Grant Connell Tennis Centre Expansion", prepared by Shape Architecture Inc, including sheet L3.01.

5. Completion of the plantings must be to the satisfaction of the Environmental Protection officer and will be inspected at the 1 and 2 year intervals, where an 85% survival rate must be met as part of this project.

6. Tree retention, as described as "Grant Connell Tennis Centre Expansion", and titled "Tree Management Plan", prepared by Shape Architecture and including sheet L0.01, to be retained in conjunction with Habitat Compensation Restoration Plan.

7. Construction on the site must adhere to all requirements of the Environmental Protection and Preservation Bylaw, including, but not limited to:
    i. During the project extreme care must be taken to ensure that absolutely no cement wash or other substance deleterious to Aquatic life enter the Creek, Creek bank, Wetland or the storm water system.

    ii. Soil removal and excavation is permitted on the site for foundation work only.

    iii. Excavated soil is to be removed from the District of North Vancouver or to a site approved by the building inspector.

    iv. Sediment and erosion control for the site to be as per the submitted plan, described as "Erosion and Sediment Control Plan", as prepared by CoreGroup Consultants, including sheet C2 and maintained in compliance with the EPPB at all times
    .
    v. Imported soil and fill for the site must comply with residential contaminant criteria as per the EPPB.

    vi. CDNV equipment called in to clean sediment from the roads will be charged to the project.

    vii. A copy of the permit to be on site at all times.

8. Prior to the issuance of a Building Permit the following shall be submitted to:

    (a) Building Department:

        (i) A detailed list of the proposed green building measures to be included in the project, generally in accordance with "Approach to Sustainable Design" and "Proposed Sustainable Design Features", prepared by Shape Architects and dated May 23, 2012. The proposed green building measures shall be prepared by a Registered Professional for the acceptance of the General Manager of Planning, Properties and Permits;

        (ii) A letter from a Registered Professional confirming that the green building measures accepted by staff are included in the building permit submission;

        (iii) A Letter of Assurance from a geotechnical engineer stating that the design of the foundation and placement of mechanical equipment has addressed the risk of soil liquefaction and flooding.

(b) Engineering, Parks and Facilities Division:

(i) Finalized civil and electrical engineering plans designed by a Professional Engineer, for review and acceptance by the Engineering Department;

(ii) An executed Development Servicing Agreement between the property owner and the District.

(iii) A finalized on and off-site landscape plan including details of soft and hard landscaping, the Fire Department connection, and garbage and recycling areas;

(iv) A written cost estimate for the installation of all on and off-site landscaping as shown on the final approved landscape plan, submitted by the Landscape Architect, for acceptance by the General Manager of Engineering, Parks and Facilities.

(v) A completed "Permission to Enter" agreement to provide evidence that a Landscape Architect has been retained to supervise the installation of the landscape works and the written authorization for the District or its agents to enter the premises and expend any or all of the deposit monies to complete the landscape works in accordance with the approved landscape plan.

C. The following requirements are hereby imposed under subsections 925(1) and (2) of the Local Government Act:

1. A security deposit equal to the greater of 125% of the estimated cost of all on-site landscaping, in accordance with the approved cost estimate, or 10% of the construction value accepted on the building permit application. The deposit will be held as security for landscaping, building and environmental works.

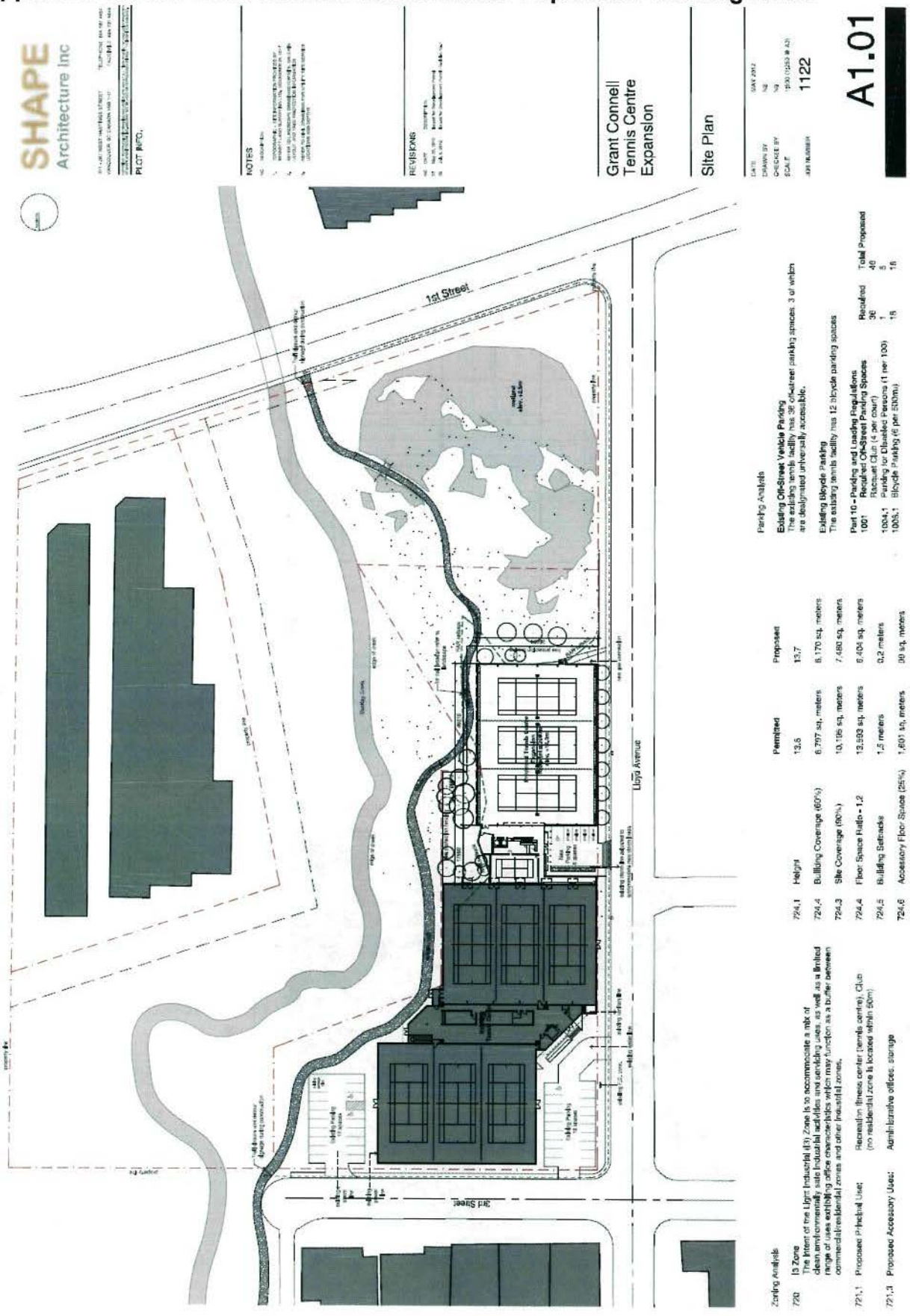
2. An engineering security deposit, in an amount specified in the Engineering Services Agreement, to cover the construction and installation of all off-site engineering and landscaping requirements.

_____
Mayor

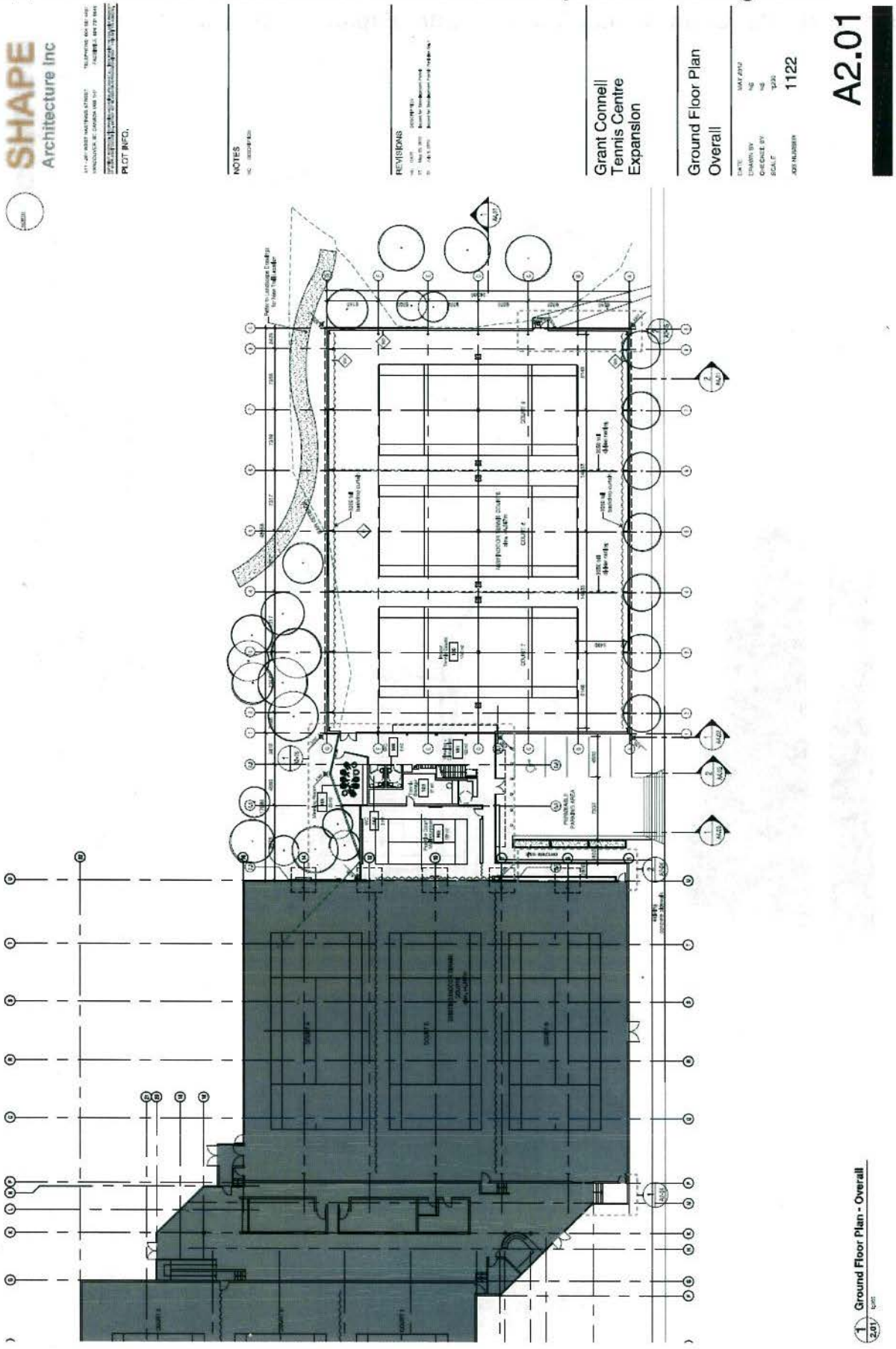
_____
Municipal Clerk

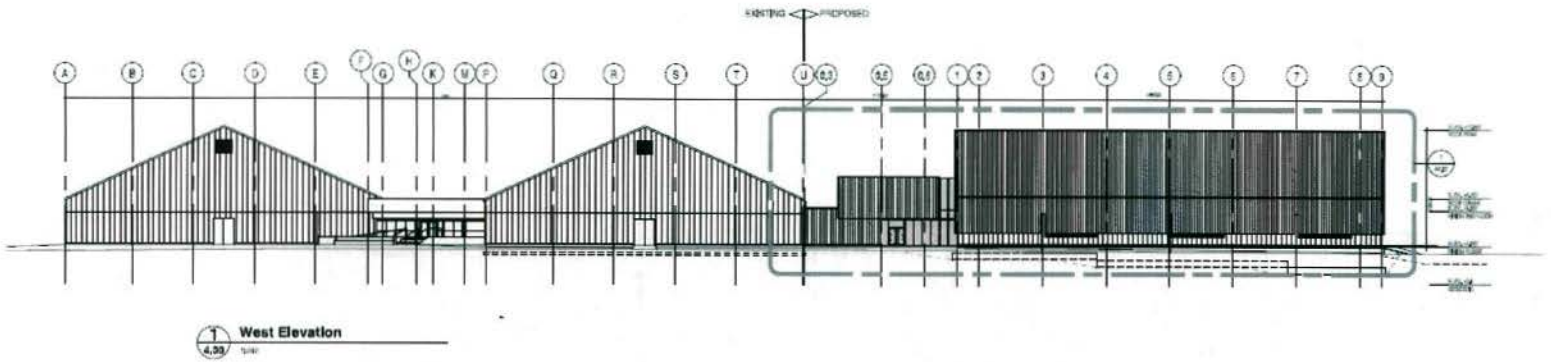
Dated this 24th day of July, 2012.

Appendix 40.12a: Grant Connell Tennis Centre Expansion Drawing A1.01

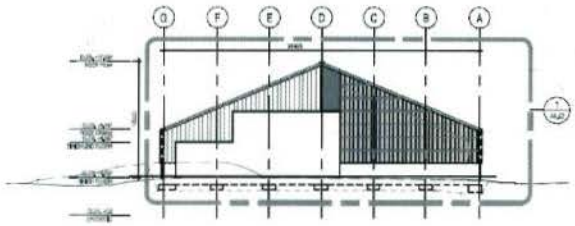


Appendix 40.12b: Grant Connell Tennis Centre Expansion Drawing A2.01

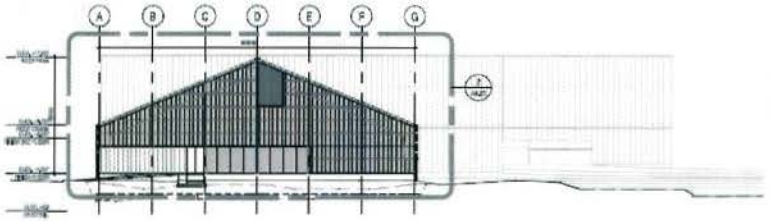




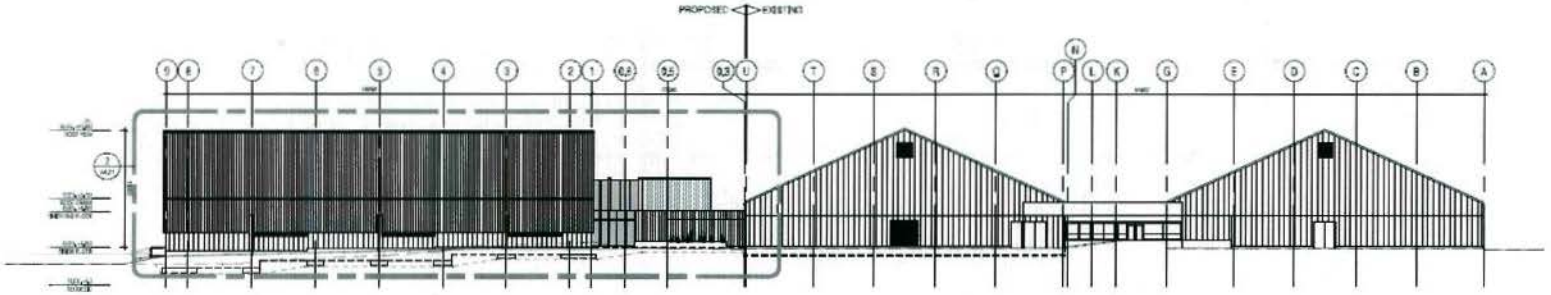
1 West Elevation



2 North Elevation



3 South Elevation



4 East Elevation

SHAPE
Architecture Inc

PLOT INFO.

NOTES

REVISIONS

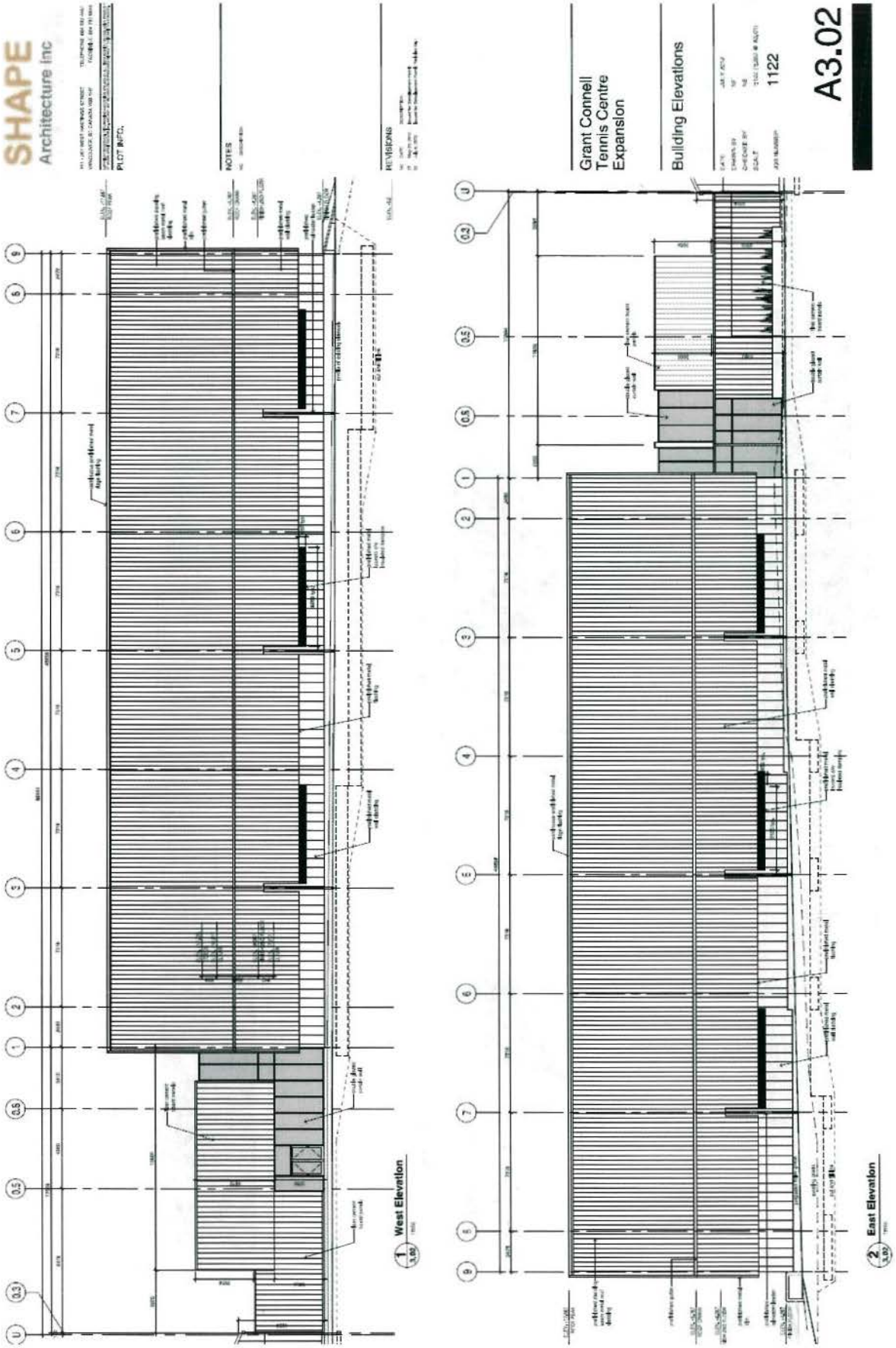
Grant Connell
Tennis Centre
Expansion

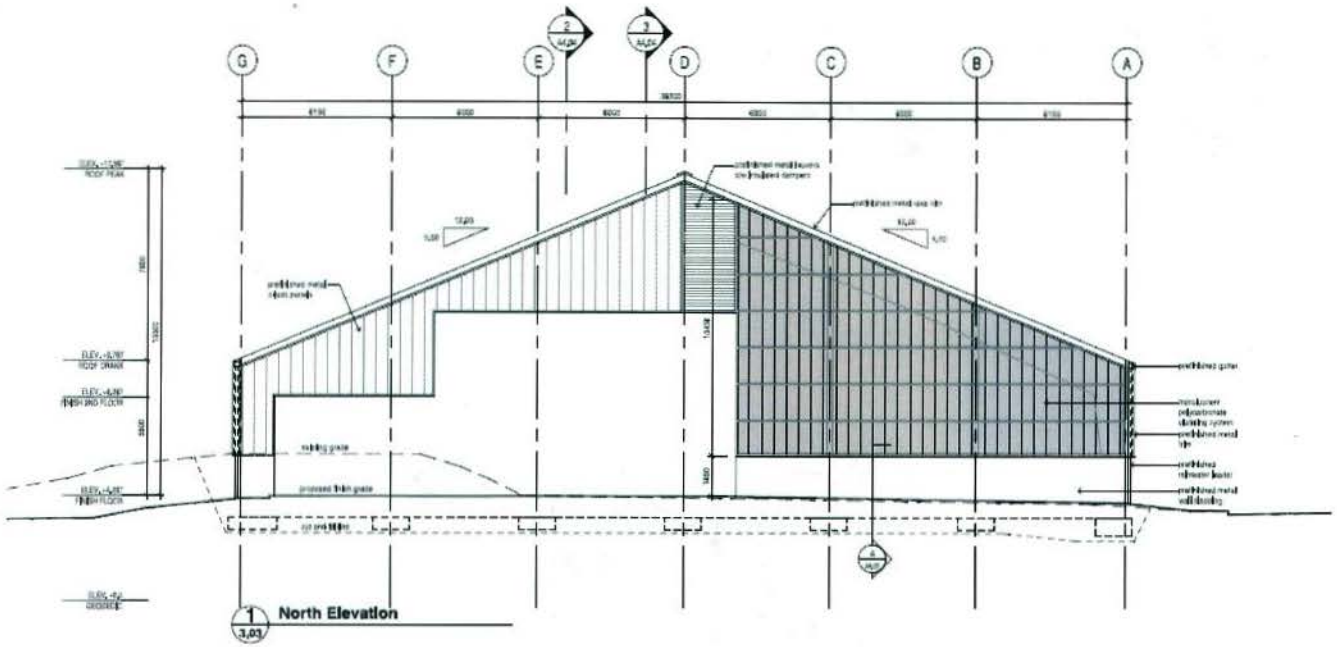
Building Elevations

DATE	JUNE 2014
DRAWN BY	MF
CHECKED BY	NB
SCALE	1:200 (1:200 @ A3)
JOB NUMBER	1122

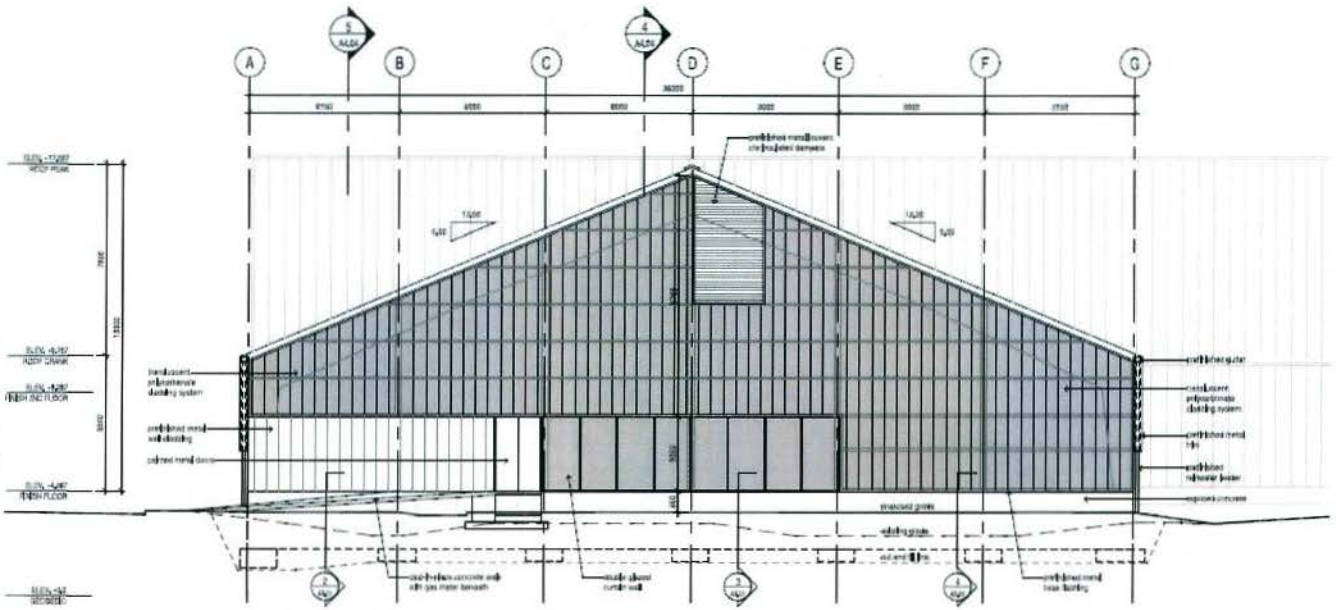
A3.01

Appendix 40.12d: Grant Connell Tennis Centre Expansion Drawing A3.02





1 North Elevation
3.03



2 South Elevation

SHAPE
Architecture Inc

PLOT INFO.

NOTES

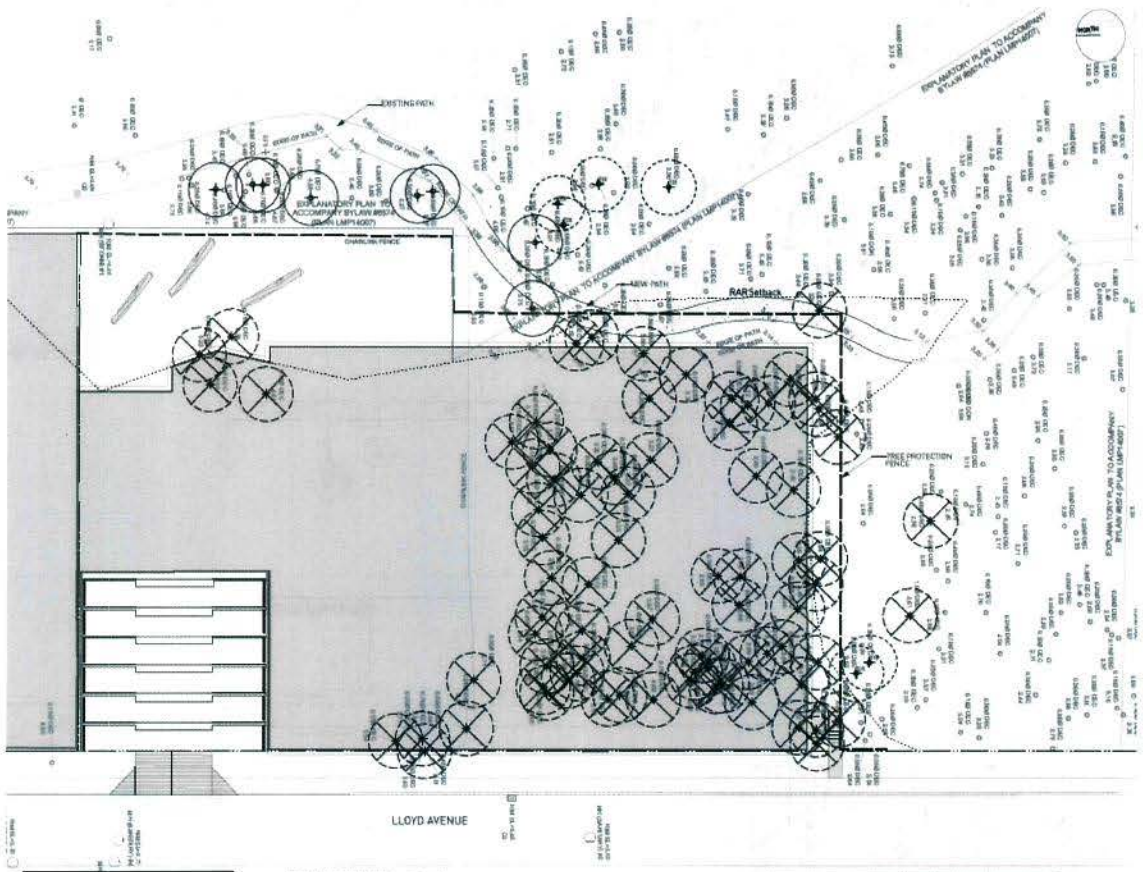
REVISIONS

Grant Connell
Tennis Centre
Expansion

Building Elevations

DATE	JULY 2017
DRAWN BY	NF
CHECKED BY	NB
SCALE	1:100 (1:200 A3,21)
JOB NUMBER	1122

A3.03



EXISTING TREE LEGEND

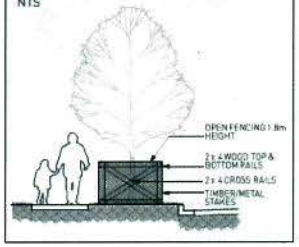
- EXISTING TREE TO BE RETAINED
- EXISTING TREE TO BE RETAINED AND MONITORED
- EXISTING TREE TO BE RETAINED AND TOPPED FOR WILDLIFE USAGE
  T10 - Top at 10 metres and monitor
  T20 - Top at 20 metres and monitor
- EXISTING TREE TO BE REMOVED
- TREE PROTECTION BARRIER

TREE PROTECTION ZONE:

1. SEE PLAN FOR LOCATION AND EXTENT OF TREE PROTECTION ZONES
2. ALL RETAINED TREES AND ALL REPLACEMENT TREES MUST BE PROTECTED BY A TREE PROTECTION BARRIER CONSTRUCTED, LOCATED AND MAINTAINED IN ACCORDANCE WITH SCHEDULE A
3. NO PERSON SHALL COMMENCE CONSTRUCTION UNLESS AND UNTIL THE TREE PROTECTION BARRIER HAS BEEN INSTALLED IN COMPLIANCE WITH SCHEDULE A
4. NO SOIL DISTURBANCE OR STRIPPING IS PERMITTED IN THIS ZONE. THE NATURAL GRADE SHOULD BE MAINTAINED
5. ANY TREE WHICH IS LOCATED WITHIN 2 M (6' 7") OF A DEVELOPMENT SITE OR ON A STREET OR LANE AND ADJACENT TO A DEVELOPMENT SITE SHALL BE PROTECTED BY A TREE PROTECTION BARRIER ON THE SITE, IN ACCORDANCE WITH SCHEDULE A, EXCEPT THAT THE TREE PROTECTION BARRIER NEED NOT EXTEND INTO THE REQUIRED SIDEYARD ON THE SITE BY THE LESSER OF 50% OF THE DISTANCE BETWEEN THE BUILDING ENVELOPMENT AND THE PROPERTY LINE, OR 1.5 M (5' 0").
6. TREE PROTECTION BARRIERS MUST BE AT LEAST 1.8M IN HEIGHT AND CONSTRUCTED OF EITHER SNOW FENCING SECURELY FASTENED TO METAL STAKES SPACED AS FURTHER THAN 1M APART, PLYWOOD NAILED TO WOOD STAKES, OR ANOTHER FORM OF BARRIER SATISFACTORY TO THE CITY BUILDING INSPECTOR OR, WHERE THE BARRIER IS ALL OR PARTIALLY LOCATED ON A STREET OR LANE ALLOWANCE, THE CITY ENGINEER
7. AFTER TREE PROTECTION BARRIERS HAVE BEEN INSTALLED, THEY MUST BE REVIEWED BY PROJECT ARBORIST
8. INFORM PROJECT ARBORIST WHEN TREE PROTECTION BARRIER FENCING CAN BE REVIEWED, PRIOR TO ANY CONSTRUCTION ON SITE
9. DO NOT STORE OR DUMP ANY MATERIALS OR EQUIPMENT WITHIN OR AGAINST THE TREE PROTECTION BARRIER. DO NOT ALLOW PARKING WITHIN THE TREE PROTECTION BARRIER
10. ANY PLANNED EXCAVATION WITHIN THE TREE PROTECTION ZONE SHOULD BE SUPERVISED BY THE CONSULTING ARBORIST. ANY CONSTRUCTION ACTIVITIES PLANNED WITHIN THE TREE PROTECTION ZONES MUST BE REVIEWED AND SUPERVISED BY THE CONSULTING ARBORIST

TREE PROTECTION BARRIER FENCING DETAIL

NTS



1 **Tree Protection Barrier Fencing Detail**
NTS

TREE PROTECTION NOTES:

GENERAL NOTES:

1. DO NOT REMOVE OR RELOCATE A RETAINED TREE EXCEPT IN COMPLIANCE WITH A TREE PLAN
2. DO NOT LIGHT A FIRE WITHIN THE DRIP LINE OF ANY TREE, ON SITE
3. DO NOT REMOVE BARK FROM ANY RETAINED TREE
4. DO NOT CAUSE ANY OTHER DAMAGE TO ANY RETAINED TREE
5. NO PERSON SHALL ALTER THE EXISTING GRADE AROUND A RETAINED TREE EXCEPT THAT A PERSON MAY RAISE THE GRADE BY NO MORE THAN 5 cm (2") WITHIN 1.0m (3'-0") OF THE TRUNK AND BY NO MORE THAN 10cm (4") FROM THAT POINT OUT TO THE DRIPLINE OF THE TREE
6. NO PERSON SHALL COMMENCE CONSTRUCTION UNLESS AND UNTIL THE TREE PROTECTION BARRIER HAS BEEN INSTALLED IN COMPLIANCE WITH THIS DRAWING AND URC STANDARDS
7. DO NOT STORE ANY MATERIALS OR EQUIPMENT WITHIN OR AGAINST THE TREE PROTECTION BARRIER OR UNDER THE CANOPY OF ANY EXISTING TREES

TREE HAZARD MITIGATION:

1. MITIGATE HAZARDS FROM IDENTIFIED HAZARDOUS TREES (SEE ARBORIST REPORT) PRIOR TO ANY WORK ACTIVITY ON SITE. THE MITIGATION IS TO BE COMPLETED BY AN EXPERIENCED ISA CERTIFIED ARBORIST. THE WORK SHOULD BE DONE CAREFULLY TO PREVENT DAMAGE TO THE TREES TO BE PROTECTED

EXCAVATION AROUND TREES:

1. EXCAVATION WITHIN DRIP LINE OF TREES ONLY WHERE INDICATED ON PLANS AND AS DIRECTED BY THE CONSULTANT
2. DURING ANY EXCAVATION, WITHIN THE DRIP LINE OF A TREE, THE CONTRACTOR SHALL EXCAVATE AROUND TREE ROOTS AS DIRECTED BY THE CONSULTANT. DO NOT CUT TREE ROOTS UNLESS DIRECTED BY THE CONSULTANT

EXCAVATION FOR NEW CONSTRUCTION WITHIN THE DRIP LINES OF TREES

1. HAND EXCAVATE TO MINIMIZE DAMAGE TO ROOT SYSTEMS
2. USE NARROW TINE SPADING FORKS TO PROBE AND COMB SOIL TO EXPOSE ROOTS
3. RELOCATE ROOTS INTO BACKFILL AREAS WHENEVER POSSIBLE. IF LARGE MAIN LATERAL ROOTS ARE ENCOUNTERED, EXPOSE BEYOND EXCAVATION LIMITS AS REQUIRED TO BEND AND RELOCATE WITHOUT BREAKING

UTILITY TRENCHING WITHIN THE DRIP LINES OF TREES

1. TUNNEL UNDER AND AROUND ROOTS BY HAND DIGGING
2. DO NOT CUT MAIN LATERAL ROOTS
3. CUTTING OF SMALLER ROOTS THAT INTERFERE WITH INSTALLATION OF NEW WORK SHALL BE DONE WITH CLEAN SHARP TREE PRUNING TOOLS
4. ROOTS THAT ARE ENCOUNTERED IMMEDIATELY ADJACENT TO THE LOCATION OF NEW CONSTRUCTION AND ARE TOO DIFFICULT TO RELOCATE, SHALL BE CUT 150MM (6") BACK FROM NEW CONSTRUCTION. USE CLEAN SHARP TREE PRUNING TOOLS

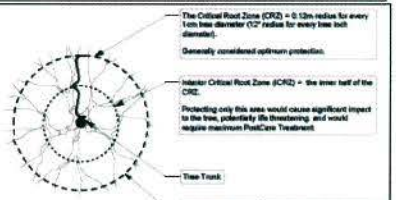
PROTECTION OF EXPOSED ROOTS

1. DO NOT ALLOW EXPOSED ROOTS TO DRY OUT PRIOR TO PLACEMENT OF PERMANENT COVER. PROVIDE ONE OF THE FOLLOWING TEMPORARY REMEDIAL MEASURES:
   a. PROVIDE TEMPORARY EARTH COVER, MAINTAIN MOISTURE
   b. PACK WITH WET PEAT MOSS, MAINTAIN MOISTURE
   c. PACK WITH FOUR LAYERS OF WET UNTREATED BURLAP, MAINTAIN MOISTURE
2. TEMPORARILY SUPPORT AND PROTECT EXPOSED ROOTS FROM DAMAGE UNTIL PERMANENTLY RELOCATED AND COVERED WITH BACKFILL
3. WATER PUDDLE BACKFILL AROUND ROOTS TO ELIMINATE VOIDS AND AIR POCKETS

SITE ACCESS:

1. CONTRACTOR TO CONTACT CONSULTANT AFTER TREE PROTECTION FENCE INSTALLATION TO REVIEW AN ACCESS PATH STRATEGY PRIOR TO COMMENCEMENT OF WORKS

NOTE: TREE PROTECTION NOTES TO BE READ IN CONJUNCTION WITH ARBOURIST REPORT. REFER TO ARBOURIST REPORT FOR TREE PROTECTION AREA GUIDELINES, RESTRICTIONS AND TREATMENTS



The Critical Root Zone (CRZ) of a tree is established on the basis of the trunk diameter. The CRZ is a circular area which has a radius of 0.12m for every 2.5cm (1" inches to every 1 inch) diameter of trunk taken 1.37m (4.5 feet) above grade. Root systems will vary both in depth and spread depending on size of tree, soils, water table, species, and other factors. However this CRZ description is generally accepted in the tree industry. Protecting this entire area should result in no adverse impact to the tree.

The above CRZ drawing has been further differentiated as the 'Perimeter' (PCRZ) and 'Interior' (ICRZ) to help illustrate potential impact and required Post Care. Generally, the full PCRZ is considered the optimum amount of root protection for a tree. As one encroaches into the 'Perimeter' CRZ, but not into the 'Interior' CRZ, the greater Post Care the tree would require to remain alive and stable. The 'Interior' CRZ is half the radius of the full PCRZ.

The absolute minimum disturbance allowed must still leave the 'Interior' CRZ undisturbed if the tree is to have any chance of survival. This 'Interior' CRZ would equal the size of a cutback needed to transplant this tree which in turn would require extensive Post Care and possibly guying. Post Care includes but may not be limited to: regular irrigation, misting root treatment with special hormones, mulching, guying, and monitoring for several years.

PWL partnership

SHAPE Architecture Inc

311 - 337 WEST HASTINGS STREET TELEPHONE 604 687 4457
VANCOUVER, BC CANADA V6B 1H7 FACSIMILE 604 731 0842

PLOT INFO.
PLOT STAMP LOCATION

NOTES
NO DESCRIPTION

REVISIONS

NO	DATE	DESCRIPTION
1	2012/05/02	Issued for Development Permit
2	2012/09/07	Issued in Response to District Engineering Review Comments

Grant Connell Tennis Centre Expansion

Schematic Design

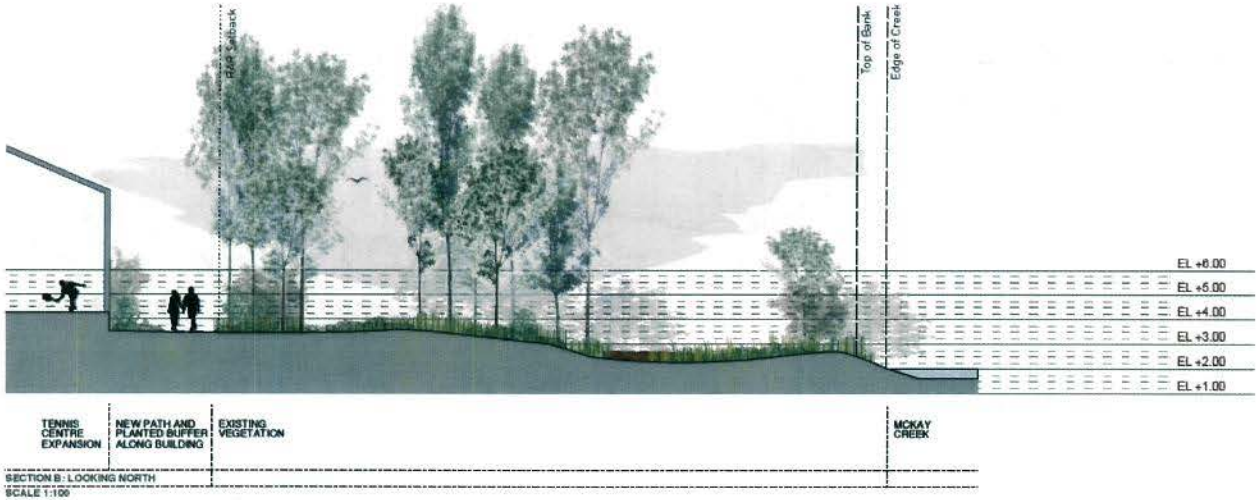
Tree Management Plan

DATE	May 2012
DRAWN BY	KY
CHECKED BY	DL/ML
SCALE	1:200 @ A1
JOB NUMBER	1225

L0.01

[redacted]

Appendix 40.12g: Grant Connell Tennis Centre Expansion Drawing L3.01



PWL partnership

SHAPE Architecture Inc

PLOT INFO.

NOTES

REVISIONS

Grant Connell Tennis Centre Expansion

Schematic Design

Landscape Sections

DATE	May 2012
DRAWN BY	KY
CHECKED BY	DL/ML
SCALE	1:200 @ A1
JOB NUMBER	1225

L6.01

Appendix 40.12h: Grant Connell Tennis Centre Expansion Drawing L6.01

Document: 1881985

Approach to Sustainable Design

Objective

The District of North Vancouver is committed to bold leadership in sustainability, therefore the objective of this development is to follow principles of sustainable design and construction. Sustainable design and construction recognizes that social, environmental and economic wellness are interdependent and strives to promote their well-being now and for future generations. The Grant Connell Tennis Centre expansion presents an opportunity to both enhance an existing public facility and remediate previous brownfield remains into an expressive riparian ecology.

Sustainable Policy and Performance Standards

The design team is aware of the District's green building policies for municipally owned facilities and understands the regulations for energy and water conservation and greenhouse gas emission reductions. The District has adopted LEED (Leadership in Energy and Environmental Design) and Built Green as baseline performance rating systems for sustainable design and construction. LEED and Built Green, however don't effectively apply to all development sectors and building types. For instance; in the case of indoor tennis buildings there are multiple LEED performance points which a tennis facility cannot physically achieve. Additionally, there are performance points which, if achieved, would actually conflict with functional tennis requirements. For these reasons and in keeping with the District's commitment to sustainability, the design team recommends following the sustainable development principles of LEED and Built Green while not pursuing certification. The team will also seek to employ proven innovative environmental strategies appropriate for indoor tennis facilities and sensitive habitats.

Sustainable Development Principles

The Grant Connell Tennis Centre Expansion will strive to meet the following principles of sustainable development.

1. Building Location

Prioritize previously developed or contaminated sites and avoid environmentally sensitive areas. Prioritize sites already serviced by utilities and transportation infrastructure. Locate buildings appropriately in their surroundings being sensitive to the character of the existing built and natural environment. Position buildings so to maximize the benefits and minimize the disadvantages of solar orientation.

2. Site Design and Management

Develop sediment and erosion control plans and de-watering, surface and rainwater management plans for all phases of construction. Protect environmentally sensitive habitat and ecology and prioritize environmental monitoring before, during and after construction. Incorporate rainwater infiltration and promote diverting rainwater from district storm sewers.

3. Construction Management

Integrate building contractors during design to promote efficiency, communication and collaboration. Develop construction and post-occupancy environmental management plans and construction safety plans.

4. Water Conservation

Utilize low flow fixtures and appliances. Incorporate metering and monitoring to avoid leaks and to assess usage patterns. Prioritize rainwater harvesting for water closet flushing and irrigation.

5. Energy Conservation

Incorporate passive design strategies to reduce energy consumption. Increase energy performance through high performance exterior envelope design. Utilize appropriate heating and cooling systems for the building type to maximize efficiency and effectiveness. Promote building systems which are powered by renewable energy sources and reduce energy loss by improving layout and design.

6. Materials

Prioritize the use of local, natural and recycled materials and reduce construction waste generation. Select low emitting and low embodied energy materials.

7. Indoor Environment

Prioritize access to fresh air and natural light. Provide appropriate distribution and controls of space heating and cooling for thermal comfort. Reduce and control indoor moisture levels and exposure to gases, contaminants and pollutants.

8. Durability

Promote durability of the building enclosure and its components through appropriate design, material selection, and construction practices. Design and specify materials and systems that can be easily cared for and maintained. Maximize building longevity by educating facility managers and operators of maintenance procedures.

9. Community Access and Involvement

Engage the local community in the planning and design process. Design safe and secure access for all.

10. Future Flexibility

Incorporate flexible infrastructure for future upgrades such as developments in photo-voltaic energy generation, solar hot water systems and information technology. Incorporate future expansion plans into the site, servicing and building design.

11. Innovative Technology

Promote the use of innovative technologies for the purposes of reducing energy or water consumption.

Proposed Sustainable Design Features

1. Building Location

A. The development will expand an existing facility and utilize existing utility services where possible.

B. The building footprint is setback away from sensitive habitat and ecology.

C. Portions of the existing site where previous industrial development had occured will be remediated and restored to an expressive riparian habitat.

D. The new roof will be of a light colour and highly reflective to minimize any contribution to urban heat island effect.

2. Site Design and Management

A. Detailed erosion and sediment control plans will be prepared for all phases of construction.

B. Detailed de-watering and rainwater management plans will be prepared for all phases of construction.

C. The project site will be environmentally monitored during all phases of construction to mitigate against any environmental impact.

D. The site will be monitored after construction is completed in order to assess post occupancy impact and design conformance.

E. The design team minimized on-site parking to the minimum allowable in order to reduce the site development area.

F. Rainwater will be diverted from the storm system back into the ground through an on site infiltration zone. The infiltration zone will be designed with an overflow into the storm system to prevent flooding or direct outlet of any contaminants.

G. New on-site parking will utilize permeable paving to reduce storm water loads.

3. Construction Management

A. Pre-construction services will be provided during the design phase by a construction manager with the intent of coordinating and further developing the sustainable construction strategies.

B. The construction manager together with the design team will develop a detailed environmental management plan.

C. The construction manager will prepare a detailed construction safety plan.

4. Water Conservation

A. The existing tennis facility and the proposed expansion will be classified as one whole building for the purposes of reducing the plumbing load calculation and the need for new water closets.

B. Rainwater will be collected and used for temporary irrigation.

C. High efficiency plumbing fixtures will be utilized.

D. Native plant species will be used to eliminate the need for permanent irrigation.

5. Energy Conservation

A. Tennis buildings conserve energy relative to typical commercial or residential buildings because they demand a lower average indoor air temperature for tennis play.

B. The building will be tempered using a hydronic in-floor radiant heating system which conserves more energy and reduces long term energy costs relative to a traditional forced air heating system.

C. The radiant heating system is most appropriate for indoor tennis because it delivers heat in the floor where tennis play occurs. In contrast many forced air systems must be increased in size in order to blow warm air down toward the players when it is delivered in the conventional ceiling location.

D. By utilizing a gas-fired boiler the existing facility's electrical power has capacity to service the expansion, therefore an electrical upgrade will not be required.

E. The building will be designed solar hot water ready for future upgrades.

G. The tennis expansion will be almost entirely passively ventilated utilizing the principles of stack effect. The passive ventilation system will be assisted with a mechanical fan for limited use on very warm days.

H. The tennis area of play will be designed to maximize natural daylight. The artificial light fixtures will have individually controllable ballasts to reduce light levels during daytime use.

6. Materials

A. Priority will be given to materials which have a high degree of recycled content.

B. Low VOC emitting paint will be used and interior finishes which off-gas will be minimized.

C. Priority will be given for locally sourced materials.

7. Indoor Environment

A. All new occupied areas, except storage and washrooms, will have access to natural daylight and views of the outdoors.

B. All new occupied areas will have access to fresh air and ventilation controls.

G. The area of tennis play will be passively ventilated utilizing the principles of stack effect. Low level intake air louvers will be located around the perimeter of the building which will draw in cool fresh air from the surrounding forest and exhaust hot stale air out of the building through a continuous roof ridge vent. The building will achieve between 1 - 4 air changes per hour.

8. Durability

A. Impact resistant materials will be used throughout the interior and exterior of the tennis expansion.

B. Maintenance and Operations manuals will be delivered to the owner or operator upon completion of the project.

9. Community Access and Involvement

A. The North Vancouver Tennis Society and the North Shore Streamkeepers have been involved in preliminary design and development discussions.

B. As part of the Development Permit Application a public information open house will be held for the community to learn more about the expansion project and provide the opportunity to discuss the proposal.

C. As part of the Development Permit Application information packages describing the proposed project will be distributed to adjacent residents and business with an opportunity to submit written comments.

Appendix 40.12j: Grant Connell Tennis Court Expansion Amended Habitat Assessment

Keystone Environmental
Knowledge-Driven Results
March 14, 2012

District of North Vancouver
c/o Mr. Benson Chow, P.Eng., PMP
355 West Queens Road
North Vancouver, BC V7N 4N5

Dear Mr. Chow:

Re: Grant Connell Tennis Court Expansion Amended Habitat Assessment
280 Lloyd Avenue, North Vancouver, BC
Project No. 11209

INTRODUCTION

This report presents the findings of the habitat assessment and detailed Riparian Areas Regulation report completed by Keystone Environmental Ltd. (Keystone Environmental) for the Grant Connell Tennis Centre (GCTC) Expansion located in the District of North Vancouver (DNV), BC. Specifically, the objective of the study was to assess the existing habitat and environmental sensitivities of the site where potential impacts could occur from expansion of the tennis court facilities.

SITE DESCRIPTION

The existing facility is located on the corner of 3rd Street and Lloyd Avenue in North Vancouver, and it consists of six enclosed tennis courts and entrance hall, with two parking lots. MacKay Creek is located east of the existing facilities, flowing in a southerly direction to Burrard Inlet. A gravel pathway winds from the northeast corner of the parking area, parallel to MacKay Creek in a southerly direction towards 1st Street. Plans for the facility expansion include the installation of five enclosed tennis courts and a parking lot. Currently, a deciduous forest and associated wetland complex are located between the existing facilities and 1st Street to the south.

The site topography is hummocky with low relief and the local surficial geology of the area, as determined by consulting the Geological Survey of Canada Map 1486A (1976), is comprised of mountain stream marine deltaic medium to coarse gravel and minor sand up to 15 m or more thick. A geotechnical investigation is planned as part of the engineering design process to confirm ground conditions.

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Environmental Consulting
Engineering Solutions
Assessment & Protection

ASSESSMENT METHODOLOGY AND BACKGROUND INFORMATION

Field investigations were used to confirm environmental information collected during the background literature review and to identify and record other potential Valued Ecosystem Components (VECs) that could be impacted by the proposed project works. The likely presence of wildlife, birds, aquatic life, and species and habitat at risk in the project area was also assessed during field surveys. Photographs, representing and describing the biophysical elements in the study area, are provided in Attachment B.

Prior to conducting the field survey, a review of online databases was conducted to identify recorded environmental sensitive areas or threatened and endangered species on-site or in the vicinity. The following databases were reviewed:

- BC Ministry of Environment (MOE) Conservation Data Center (CDC) species lists and Element Occurrence Reports (EOR)
- Community Mapping Network (CMN) Sensitive Habitat and Inventory Mapping (SHIM)
- BC Biogeoclimatic Ecosystem Classification Map
- District of North Vancouver Geoweb application
- Fisheries Information Summary System (FISS) and Habitat Wizard

The on-line search of the CDC database for known occurrences of rare wildlife, plants, and ecological communities within five kilometres of the site was conducted and revealed one masked occurrence record numbered 7974. Occurrences are masked on public maps when sensitivities exist with the species and/or ecological communities. Information regarding the masked occurrences can be requested; however, such information is confidential and cannot be disseminated. Contact with the CDC regarding occurrence 7974 resulted in the decision that project development would not interfere with this species. The BC Species and Ecosystems Explorer search results for species at risk which are known to occur within the Coastal Western Hemlock, Biogeoclimatic Zone, Chilliwack Forest District, Lower Mainland Region are listed in Tables 1 and 2 of Attachment C.

Database queries were made to the online databases Fisheries Information Summary System, Habitat Wizard, and Sensitive Habitat Information Mapping (SHIM) to collect background information on fisheries values for McKay Creek. McKay Creek has the following documented fish species present: Chum Salmon (*Oncorhynchus keta*), Coastrange Sculpin (Cottus *aleuticus*), Coho Salmon (*Oncorhynchus kisutch*), Cutthroat Trout (*Oncorhynchus clarkia*), Pink Salmon (*Oncorhynchus gorbuscha*), Prickly Sculpin (*Cottus asper*), Rainbow Trout (*Oncorhynchus mykiss*), Slimy Sculpin (*Cottus cognatus*), Steelhead (*Oncorhynchus mykiss*), Threespine Stickleback (*Gasterosteus aculeatus*), and Western Brook Lamprey (*Lampetra richardsoni*).

From the list of fish species known to occur in MacKay Creek, cross referenced with the Ministry of Environment Ecosystem Explorer database (Attachment C, Table 3), the following are of management concern:

- Coho Salmon (*Oncorhynchus nerka*), ranked as endangered by COSEWIC

- Cutthroat Trout subspecies (*Oncorhynchus clarkii clarkii*) ranked Blue provincially, and the subspecies (*Oncorhynchus clarkii lewsi*) ranked Blue provincially and special concern by COSEWIC and the Species At Risk Act.
- Three-spine stickleback (*Gasterosteus aculeatus*) ranked as special concern by COSEWIC.

Wildlife surveys followed the British Columbia Resource Inventory Standards Committee (RISC) protocols and methodologies where applicable and appropriate, for raptors, songbirds, ungulates, small mammals arthropods, and amphibians. The focus of the wildlife assessment was to identify the potential presence and/or potential breeding habitat for rare or threatened (i.e., red- or blue-listed) vertebrate and invertebrate animal species of management concern as listed by:

- The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (as of December 2011)
- Schedule 1 of the federal *Species at Risk Act*
- The CDC's Animal Tracking List for the Chilliwack Forest District (as of December 2011)

Bird surveys focused on identifying the presence/not-detected status of rare birds listed in the CDC and COSEWIC lists. Habitat usage was evaluated by direct nest identification, faecal wash, prey remains, feathers or any other signs indicating that birds may inhabit the area. The searches were completed in order to verify active use within the site's habitat units, primarily by raptors (i.e., hawks and owls), and/or by songbirds, herons or other bird species. Based on these visual observations, the occurrences of raptor nests or roosts, heron nests and other nests were classified as "present" or "not detected." Significant cavity trees and/or wildlife trees with the potential to serve as roosting sites were also investigated for diurnal and nocturnal bird presence and/or use.

Large (>500 grams) and small (<500 grams) mammal presence was recorded based on signs of presence: scat, tracks, forage/browse indicators, scrapings, and direct field observation/reported sightings. The terrestrial invertebrate, amphibian and reptile assessments involved identification of habitats (i.e., ponded/pooled water areas) typically used by species of management concern. Habitat units defined during the vegetation survey were cross-referenced with the life requisites of species of management concern (red- or blue-listed) to evaluate potential occurrence and habitat usage in the study area.

ECOLOGICAL CONTEXT

The project area is located within the Coastal Western Hemlock (Dry Maritime Subzone – CWHdm) biogeoclimatic zone which occurs at low elevations on the mainland and immediately adjacent islands. It extends from Hardwicke Island in the north to the Chilliwack River in the southeast. Elevation limits range from sea level to approximately 650 m (lower in wetter valleys). The project area lies entirely within the Fraser Lowland Ecosection, which consists of the Fraser delta, estuary, lowlands and associated uplands.

The CWH is, on average, the rainiest biogeoclimatic zone in BC. The zone typically has a cool mesothermic climate with cool summers (although hot dry spells can be frequent) and, like the Coastal Douglas-Fir zone (CDF), mild winters. The mean annual temperature is about 8 °C and ranges from 5.2 °C – 10.5 °C among the CWH subzones. The mean monthly temperature is above 10 °C for 4-6 months of the year. The mean temperature of the coldest month is 0.2 °C and ranges from -6.6 °C – 4.7 °C among the subzones. Mean annual precipitation for the zone as a whole is 2,228 mm, and ranges from 1,000 mm to 4,400 mm. Less than 15% of the total precipitation occurs as snowfall in the south, but as much as 40%-50% in the northern parts of the zone. The CWHdm subzone has warm, relatively dry summers and moist, mild winters with little snowfall. Growing seasons are long and feature only minor water deficits on zonal sites.

Forests within the CWHdm subzone are dominated by Douglas fir, western redcedar, and western hemlock. Major understorey species within the CWHdm subzone include salal, red huckleberry, and mosses (*Hylocomium splendens*, *Kindbergia oregana*, *Rhytidiadelphus loreus*, and *Plagiothecium undulatum*). Less common species include dull Oregon grape (*Mahonia aquifolium*), vine maple (*Acer circinatum*), bracken fern (*Pteridium aquilinum*), and sword fern (*Polystichum munitum*).

Vegetation

A single habitat unit was present on the proposed area of expansion and consisted of the riparian forest area. The forest was dominated by mature black cottonwood (*Populus trichocarpa*) with a subdominant canopy of semi-mature red alder (*Alnus rubra*). Very few wildlife trees were observed, and virtually none of an advanced decay class was present on the west side of McKay Creek. Understorey conifer regeneration was sparse, most likely due to the presence of a seasonal high water table; however, some Douglas fir (*Pseudotsuga menziesii*) seedlings and western redcedar (*Thuja plicata*) seedlings had been planted along what was the old trail on the McKay Creek floodplain (the existing trail runs upland of the top of bank of the floodplain and was moved to that location because of repeated flooding).

The well-established shrub understorey was comprised almost entirely of salmonberry (*Rubus spectabilis*), with minor components of red elderberry (*Sambucus racemosa*), and English holly (*Ilex aquifolium*). A sign denoting the recent herbicidal treatment of Japanese knotweed (*Polygonum cuspidatum*) and giant hogweed (*Heracleum mantegazzianum*) was present on the trail beside the recreational facility; neither species was observed within the study area.

The forbes layer was dominated by the invasive species English ivy (*Hedera helix*) and periwinkle (*Vinca minor*), which had carpeted the forest floor throughout the habitat unit. English ivy was observed to have climbed several trees in the area to heights in excess of 8 m. Remedial treatment of the aboreal ivy was evidenced by cut runners at the base of several trees in the area, although the persons responsible are not known. Other plants which comprised a minor component of the herb and moss layer included sword fern (*Polystichum munitum*), common horsetail (*Equisetum arvense*), Oregon beaked moss (*Eurhynchium oreganum*), and the invasive species morning glory (*Ipomoea violacea*) and mint (*Mentha* sp.). Leaf litter present was from seasonal abscission and covered the mats of ivy and periwinkle; however, deep litter layers were not observed. Coarse woody debris was sparse and, where present, it was of small diameter. Grass and sedge species were present at the edges of the wetland.

Wildlife

Wildlife observations were limited due to the seasonality of the study and the relatively small area examined. Migratory birds which may utilize the forested habitat for forage and breeding during the spring and summer would not be present in November, and other amphibian or small mammal species could be dormant or inactive due to the lower daily temperatures.

Birds identified during the field visit either visually or by call included the winter wren (*Troglodytes hiemalis*) and the northwestern crow (*Corvus caurinus*). A great blue heron (*Ardea herodias*) was observed in the McaKay Creek estuary, south of the site. Several stick nests were present within the trees of the forested area and were likely built and used by northwestern crows. Habitat on-site was suitable to meet nesting and foraging requirements for a number of migratory songbirds. Although no small mammals, amphibians or reptiles were observed during the site visit, there is suitable habitat for both groups (i.e., squirrels and salamanders).

Black tailed deer (*Odocoileus hemionus columbianus*) scat was observed in the forested area, and racoon (*Procyon lotor*) tracks were found in sediment beside McaKay Creek. Beaver (*Castor canadensis*) activity was also observed.

Species at Risk

Upon completion of the field survey, the habitat/vegetation unit for the study area was defined and cross-referenced and rated for its value to potentially occurring species of management concern, using methodologies outlined in the RISC manuals. Species were chosen based on each species' life requirements and the habitat available on or immediately surrounding the site relative to the species of focus. Species-specific surveys (i.e., trapping, electrofishing, or other population studies or RISC sampling protocols) were not conducted at the time of the field survey.

Table 1 following lists the provincial red- and blue-listed species which occur within the Coastal Western Hemlock, Biogeoclimatic Zone, Chilliwack Forest District, Lower Mainland Region and that could potentially occur in the study area based on the quality of identified habitat. A habitat rating of high or moderate denotes an increased likelihood for the occurrence of that species, whereas a habitat rating of low indicates a decreased likelihood of species occurrence. Species which had a habitat rating of nil are not included in the table.

In total, twelve at risk species of vegetation and wildlife were found to have life requisites that could be met with all or part of the habitat on-site. Habitat was rated high for three and low for six wildlife species at risk. It was also rated high for one, moderate for one, and low for one plant species at risk. Of the species rated moderate to high, potential impacts from development would most likely negatively affect only two species, if occurring on-site. Both vegetation species rated with moderate or high habitat potential (streambank lupine and Vancouver Island beggarticks) would be expected to occur either adjacent to the wetland or on the MacKay Creek floodplain, outside of the developmental footprint, and therefore would not be affected if protected. Likewise, habitat for the western painted turtle would be associated primarily with the wetland limiting potential negative impacts. Impacts to the great blue heron and Pacific water shrew, if occurring on site, could be significant due to removal of the deciduous forest area.

Multiple stick nests were located within the developmental footprint and, although most likely built and utilized by northwestern crow, these nests have the potential to be used by great blue herons. Nests of the great blue heron, both active and inactive, are protected on all land tenures in BC under the BC *Wildlife Act*. Individuals and critical habitat on federal land are protected under the federal *Species at Risk Act*. Project construction could also cause the inadvertent mortality of Pacific water shrew and destruction of their habitat if occurring on-site. This species is similarly protected under the BC *Wildlife Act* on all land tenures in BC, and by the federal *Species at Risk Act*.

Table 1 Species at Risk Potential Occurrence Based on Habitat Requisites

Scientific Name	Common Name	Provincial Status	SARA status	Habitat Rating: High, Moderate, Low	Comments
Ardea Herodias fannini ssp.	Great Blue Heron	Blue	SC	High	Suitable habitat exists for nesting, roosting, and foraging. This species was observed within the MacKay Creek estuary and on-site.
Bidens amplissima	Vancouver Island beggarticks	Blue	E	High	Suitable habitat exists within the MacKay Creek floodplain and wetland edges.
Chysemys picta pop.1	Western Painted Turtle	Red	E	High	Suitable habitat exists for all life requisites within the wetland for forage and breeding.
Sorex Bendirii	Pacific Water Shrew	Red	E	High	Suitable habitat exists within the riparian zones of MacKay Creek and the wetland for all life requisites.
Lupinus rivularis	Streambank lupine	Red	E	Moderate	Marginal habitat under the deciduous canopy cover. More likely to occur within the MacKay Creek estuary.
Anaxyrus boreas	Western Toad	Blue	SC	Low	Suitable forage and breeding habitat; however, the high degree of geographic fragmentation limits ranging ability. A low likelihood of occurrence.
Ascaphus truei	Coast Tailed Frog	Blue	SC	Low	A low stream gradient, successional forest, lack of CWD, and the presence of invasive species decreases the likelihood for this species occurrence.
Brotherella roelli	Roell's Brotherella	Red	E	Low	The carpet of invasive species covering niche areas for this organism reduces the likelihood of occurrence.
Contopus cooperi	Olive-sided flycatcher	Blue	T	Low	Suitable forage habitat, but breeding and nesting habitat is limited.
Megascops kennicottii kennicottii	Western Screech Owl	Blue	SC	Low	Suitable forage habitat exists. Habitat does not suit nesting requirements.
Rana aurora	Red-legged frog	Blue	SC	Low	Fragmented habitat and impacts from development and invasive species reduces occurrence likelihood.
Rana pretiosa	Oregon Spotted Frog	Red	E	Low	Fragmented habitat and impacts from development and invasive species reduces occurrence likelihood

DISCUSSION

The GCTC Expansion project has been reduced in scope to avoid negative environmental impacts (loss of successional deciduous forest and wetland complex located within the riparian setback areas of both MacKay Creek and the wetland) to MacKayCreek.

In determining the wetland setback, survey protocols outlined in the detailed methodology of the Riparian Areas Regulation (RAR) were used; the high water mark was determined to be 2.3 m. Zones of sensitivity were determined for large woody debris (LWD), insect and litter drop and shade by examining the aspect and vegetation type surrounding the wetland and on the western bank of MacKay Creek. From this application, a 15 m setback was indicated for the wetland. The setback from the high water mark of Mackay Creek was determined to be 26.2 m using the detailed RAR assessment methodology (the detailed RAR assessment report is attached).

There is a minor encroachment of 37 m^2 into the riparian setback along MacKay Creek due to meanders in the SPEA setback lines derived from the meanders as surveyed along the high water mark of MacKay Creek. This minor amount falls within previously disturbed area (vacant lot used for bedload removal storage) and far removed from the creek by intervening pedestrian pathway. Through the use of practical habitat restoration and enhancement techniques, this small amount can be adequately compensated for on-site by revegetation of the vacant lot once the bedload has been removed and the new building constructed. An equal mix of native tree and shrub species should be planted (minimum one per metre squared).

To perform due diligence for management of species at risk, the following actions are also recommended prior to any disturbance of the site:

- Performance of a nest survey prior to any clearing and grubbing, and further study of the stick nests on-site to determine species utilization, if warranted (those nests may no longer fall within the actual development footprint; on the other hand, raptors and species at risk may build new nests between now and the start of construction which is unknown at this time
- Isolation of the development footprint with exclusion fencing and, under permit, conducting small mammal trapping for Pacific water shrews and relocating animals outside of the construction zone prior to start up

STUDY LIMITATIONS

This report has been prepared solely for the internal use of the District of North Vancouver pursuant to the agreement between Keystone Environmental Ltd. and the District of North Vancouver. A copy of the general terms and conditions associated with this agreement is attached. By using this report, the District of North Vancouver agrees that they will review and use the report in its entirety. Any use which other parties make of this report, or any reliance on or decisions made based on it, are the responsibility of such parties. Keystone Environmental Ltd. accepts no responsibility for damages, if any, suffered by other parties as a result of decisions made or actions based on this report.

We trust the information presented is sufficient for your current needs. Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

Keystone Environmental Ltd.

For

Andrew Booth, B.Sc., B.I.T.
Project Biologist

Shawna Reed, Ph.D., R.P.Bio,
Director of Biological Services

11209 120314 Grant Connell Tennis Centre Habitat Assessment_final.doc

ATTACHMENTS:

- Attachment A: Figures
- Attachment B: Photographs
- Attachment C: Tables
- Attachment D: Detailed RAR Report
- Attachment E: Keystone Environmental Ltd. General Terms and Conditions for Services

Table 1 Federally/Provincially Rare Wildlife Species Occurring within the CWH Biogeoclimatic Zone, Chilliwack Forest District, Lower Mainland Region

Common Name	Scientific Name	Provincial Rank	Federal Rank
Western Toad	*Anaxyrus boreas*	Blue	SC
Pacific Tailed Frog	*Ascaphus truei*	Blue	SC
Pacific Giant Salamander	*Dicampton tenebrosus*	Red	T
Northern Red-legged frog	*Rana aurora*	Blue	SC
Oregon Spotted Frog	*Rana pretiosa*	Red	E
Northern Goshawk laingi subspecies	*Accipiter gentilis laingi*	Red	T
Great Blue Heron fannini subspecies	*Ardea Herodias fannini*	Blue	SC
Short-eared Owl	*Asio flammeus*	Blue	SC
Marbled Murelet	*Brachyramphus marmoratus*	Blue	T
Common Nighthawk	*Chordeiles minor*	Yellow	T
Olive-sided Flycatcher	*Contopus cooperi*	Blue	T
Peregrine Falcon anatum subspecies	*Falcoperegrinus anatum*	Red	SC
Sandhill Crane	*Grus Canadensis*	Yellow	None
Western Screech Owl kennicotti species	*Megascops kennicottii kennicottii*	Blue	SC
Band-tailed Pigeon	*Patagioenas fasciata*	Blue	SC
Spotted Owl	*Strix occidentalis*	Red	E
Barn Owl	*Tyto alba*	Blue	T
Mountain Beaver, rainieri subspecies	*Aplodontia rufa rainieri*	Blue	SC
Mountain Beaver, rufa subspecies	*Aplodontia rufa rufa*	Blue	SC
Wolverine, lucus subspecies	*Gulo gulo luscus*	Blue	SC
Townsend's Mole	*Scapanus townsendii*	Red	E
Pacific Water Shrew	*Sorex bendirii*	Red	E
Grizzly Bear	*Ursus arctos*	Blue	SC
Monarch Butterfly	*Danaus plexippus*	Blue	SC
Dun Skipper Butterfly	*Euphyes vestris*	Blue	T
Western Pond Turtle	*Actinemys marmorata*	Red	XT
Northern Rubber Boa	*Charina bottae*	Yellow	SC
Western Painted Turtle-Pacific Coast Population	*Chysemys picta. Pop.1*	Red	E
Gopher Snake catenifer subspecies	*Pituophis catenifer catenifer*	Red	XT
Green Sturgeon	*Acipenser medirostris*	Red	SC
Salish Sucker	*Catostomus sp.4*	Red	E
Cultus Pygmy Sculpin	*Cottus sp.2*	Red	T
Nooksack Dace	*Rhinichthys cataractae-Chehalis lineage*	Red	E
None			
Northern Abalone	*Haliotis kamschatkana*	Red	T

SC–special concern
T–threatened
E–endangered
XT–extirpated

Blue–special concern
Red–endangered, extirpated or threatened
Yellow–not at risk

Table 2 Federally/Provincially Rare Plant Species Occurring within the CWH Biogeoclimatic Zone, Chilliwack Forest District, Lower Mainland Region

Common Name	Scientific Name	Provincial Rank	Federal Rank
Tall bugbane	*Actaea elata var. elata*	Red	E
Vancouver Island beggarticks	*Bidens amplissima*	Blue	SC
Roell's brotherella	*Brotherella roellii*	Red	E
Phantom orchid	*Cephalanthera austiniae*	Red	T
Giant helleborine	*Epipactis gigantean*	Blue	SC
Silver hair moss	*Fabronia pusilla*	Red	E
Poor pocket moss	*Fissidens pauperculus*	Red	E
Streambank lupine	*Lupinus rivularis*	Red	E
Cryptic paw	*Nephroma occultum*	Blue	SC
Whitebark pine	*Pinus albicaulis*	Blue	E
Oldgrowth specklebelly	*Pseudocyphellaria rainierensis*	Blue	SC

Table 3 Freshwater Fish Found within MacKay Creek (FISS)

Common Name	Scientific Name	Provincial Rank	Federal Rank
Chum Salmon	*Oncorhynchus keta*	Yellow	None
Coastrange Sculpin	*Cottus aleuticus*	Yellow	None
Coho Salmon	*Oncorhynchus kisutch*	Yellow	Endangered
Cutthroat Trout	*Oncorhynchus clarkii*	None	None
Pink Salmon	*Oncorhynchus gorbuscha*	Yellow	None
Prickly Sculpin	*Cottus asper*	Yellow	None
Rainbow Trout	*Oncorhynchus mykiss*	Yellow	None
Slimy Sculpin	*Cottus cognatus*	Yellow	None
Steelhead	*Oncorhynchus mykiss*	Yellow	None
Threespine Stickleback	*Gasterosteus aculeatus*	Yellow	Special Concern
Western Brook Lamprey	*Lampetra richardsoni*	Yellow	None

ATTACHMENT D

DETAILED RAR REPORT

Keystone Environmental
Knowledge-Driven Results

FORM 1

Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Riparian Areas Regulation: Assessment Report

Please refer to submission instructions and assessment report guidelines when completing this report.

Date: March 14, 2012

I. Primary QEP Information

First Name	Shawna	Middle Name		
Last Name	Reed			
Designation	RPBio	Company	Keystone Environmental Ltd.	
Registration #	1133	Email	sreed@keystoneenviro.com	
Address	320-4400 Dominion Street			
City	Burnaby	Postal/Zip	V5G 4G3	Phone # 604-430-0671
Prov/state	BC	Country	Canada	

II. Secondary QEP Information (use Form 2 for other QEPs)

First Name		Middle Name	
Last Name			
Designation		Company	
Registration #		Email	
Address			
City		Postal/Zip	Phone #
Prov/state		Country	

III. Developer Information

First Name	Richard	Middle Name	
Last Name	Boase		
Company	District of North Vancouver		
Phone #	604-990-2305	Email: boaser@dnv.org	
Address	355 West Queens Road		
City	North Vancouver	Postal/Zip	V7N 4N5
Prov/state	BC	Country	Canada

IV. Development Information

Development Type	Recreational		
Area of Development (ha)	0.18	Riparian Length (m)	30
Lot Area (ha)	3.18	Nature of Development	New
Proposed Start Date		Proposed End Date	

V. Location of Proposed Development

Street Address (or nearest town)	280 Lloyd Avenue						
Local Government	District of North Vancouver			City	North Vancouver		
Stream Name	MacKay Creek						
Legal Description (PID)	A Portion of Lot A Blocks 12, 13 and 20 District Lot 266 Plan 21750			Region	GVRD		
Stream/River Type	Stream			DFO Area	Lower Fraser		
Watershed Code	900-069300						
Latitude	49	19	10.4	Longitude	123	6	15.8

Completion of Database Information includes the Form 2 for the Additional QEPs, if needed. Insert that form immediately after this page.

Table of Contents for Assessment Report

Section 1. Description of Fisheries Resources Values and a Description of the Development proposal

MacKay Creek connects to Burrard Inlet approximately 500 m downstream of the site. Database queries were made to the online databases Fisheries Information Summary System (FISS), Habitat Wizard, and Sensitive Habitat Information Mapping (SHIM) to collect background information on fisheries values for McKay Creek. McKay Creek has the following documented fish species present: Chum Salmon (*Oncorhynchus keta*), Coastrange Sculpin (*Cottus aleuticus*), Coho Salmon (*Oncorhynchus kisutch*), Cutthroat Trout (*Oncorhynchus clarkia*), Pink Salmon (*Oncorhynchus gorbuscha*), Prickly Sculpin (*Cottus asper*), Rainbow Trout (*Oncorhynchus mykiss*), Slimy Sculpin (*Cottus cognatus*), Steelhead (*Oncorhynchus mykiss*), Threespine Stickleback (*Gasterosteus aculeatus*), and Western Brook Lamprey (*Lampetra richardsoni*).

A single habitat unit was present on-site which consisted of the riparian forest area. The forest was dominated by mature black cottonwood (*Populus trichocarpa*) with a subdominant canopy of semi-mature red alder (*Alnus rubra*). Very few wildlife trees were observed, and virtually none of an advanced decay class were present on the west side of McKay Creek. The well established shrub understorey was comprised almost entirely of salmonberry (*Rubus spectabilis*), with minor components of red elderberry (*Sambucus racemosa*), and English holly (*Ilex aquifolium*). A sign denoting the recent herbicidal treatment of Japanese knotweed (*Polygonum cuspidatum*), and giant hogweed (*Heracleum mantegazzianum*) was present on the trail beside the recreational facility, though none were observed within the study area.

The forbes layer was dominated by the invasive species English ivy (*Hedera helix*) and periwinkle (*Vinca minor*) which had carpeted the forest floor throughout the habitat unit. English Ivy was observed to have climbed several trees in the area to heights in excess of 8 m. Remedial treatment of the aboreal ivy was evidenced by cut runners at the base of several trees in the area, though the persons responsible are not known. Other plants which comprised a minor component of the herb and moss layer included sword fern (*Polystichum munitum*), common horsetail (*Equisetum arvense*), Oregon beaked moss (*Eurhynchium oreganum*), and the invasive species morning glory (*Ipomoea violacea*) and mint (*Mentha* sp.). Leaf litter present was from seasonal abscission, and covered the mats of ivy and periwinkle; however, deep litter layers were not observed. Coarse woody debris was sparse and where present, it was of small diameter. Grass and sedge species were present at the edges of the wetland.

When completing the RAR for GCTC, a lot of consideration was given to what would be considered the active floodplain. From the Riparian Areas Regulation Assessment Methods Version 3.0, section 4.2 page 42, it is stated that "Clues to identify the active floodplain include areas flooded by stream water more frequently than once in 5 years, on average and is at the same elevation as areas showing evidence of:

(a) flood channels free of terrestrial vegetation
(b) rafted debris or fluvial sediments, recently deposited on the surface of the forest floor or suspended on trees or vegetation, or
(c) recent scarring of trees by material moved by flood waters."

During the detailed survey, rafted vegetation was not observed, fluvial sedimentation was not observed adjacent to the creek, scarring was not observed, flood channels free of terrestrial vegetation were not observed. Vegetation was consistent with a terrestrial environment with tree, shrub and forb layers. Therefore, although a flood plain is present, it was not identified as a 1 in 5 year active floodplain and the High Water Mark was identified as shown in the attached drawings.

The proposed development is the addition of three new tennis courts in a building separated from the existing tennis facility by a one-lane parking area (24 parking stalls are required to meet minimum building code criteria in North Vancouver).

Section 2. Results of Detailed Riparian Assessment (SPEA width)

2a. Results of Detailed Riparian Assessment: Mackay Creek

Refer to Chapter 3 of Assessment Methodology		Date:	March 14, 2012
Description of Water bodies involved (number, type)		stream	
Stream	x		
Wetland			
Lake			
Ditch			
Number of reaches	1		
Reach #			

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)	Gradient (%)
starting point	8.97	1.5
upstream	~~7.80~~	
	7.97	
	~~10.27~~	1
	9.71	
downstream	8.3	
	8.43	
	8.76	
	8.67	1
	9.19	
	8.45	
Total: minus high /low	78.45	
mean	**8.72**	

	R/P	C/P	S/P
Channel Type	x		

I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the developrnent proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		x	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No:	1			Method employed if other than TR
	LC	SH	TR	
SPVT Type			X	

Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons						
LWD, Bank and Channel Stability ZOS (m)	26.16							
Litter fall and insect drop ZOS (m)	15							
Shade ZOS (m) max	26.16	South bank	Yes		No	x		
Ditch	Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow)				N/A			
Ditch Fish Bearing	Yes		No		If non-fish bearing insert no fish bearing status report			
SPEA maximum	26.16	(For ditch use table3-7)						

I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Comments

2b. Results of Detailed Riparian Assessment – Mackay Wetland

Refer to Chapter 3 of Assessment Methodology

Date: March 14, 2012

Description of Water bodies involved (number, type): wetland

Stream	
Wetland	
Lake	x
Ditch	
Number of reaches	N/A
Reach #	N/A

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)	Gradient (%)
starting point	N/A	N/A
upstream	N/A	N/A
	N/A	N/A
	N/A	N/A
	N/A	N/A
downstream	N/A	N/A
	N/A	N/A
	N/A	N/A
	N/A	N/A
	N/A	N/A
	N/A	N/A
Total: minus high /low	N/A	N/A
mean	N/A	

I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:
e) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
f) I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver
g) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
h) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

	R/P	C/P	S/P
Channel Type	N/A		

Site Potential Vegetation Type (SPVT)

	Yes	No
SPVT Polygons		x

Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:
e) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
f) I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver;
g) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
h) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No: 1

	LC	SH	TR	Method employed if other than TR
SPVT Type			X	N/A

Zone of Sensitivity (ZOS) and resultant SPEA

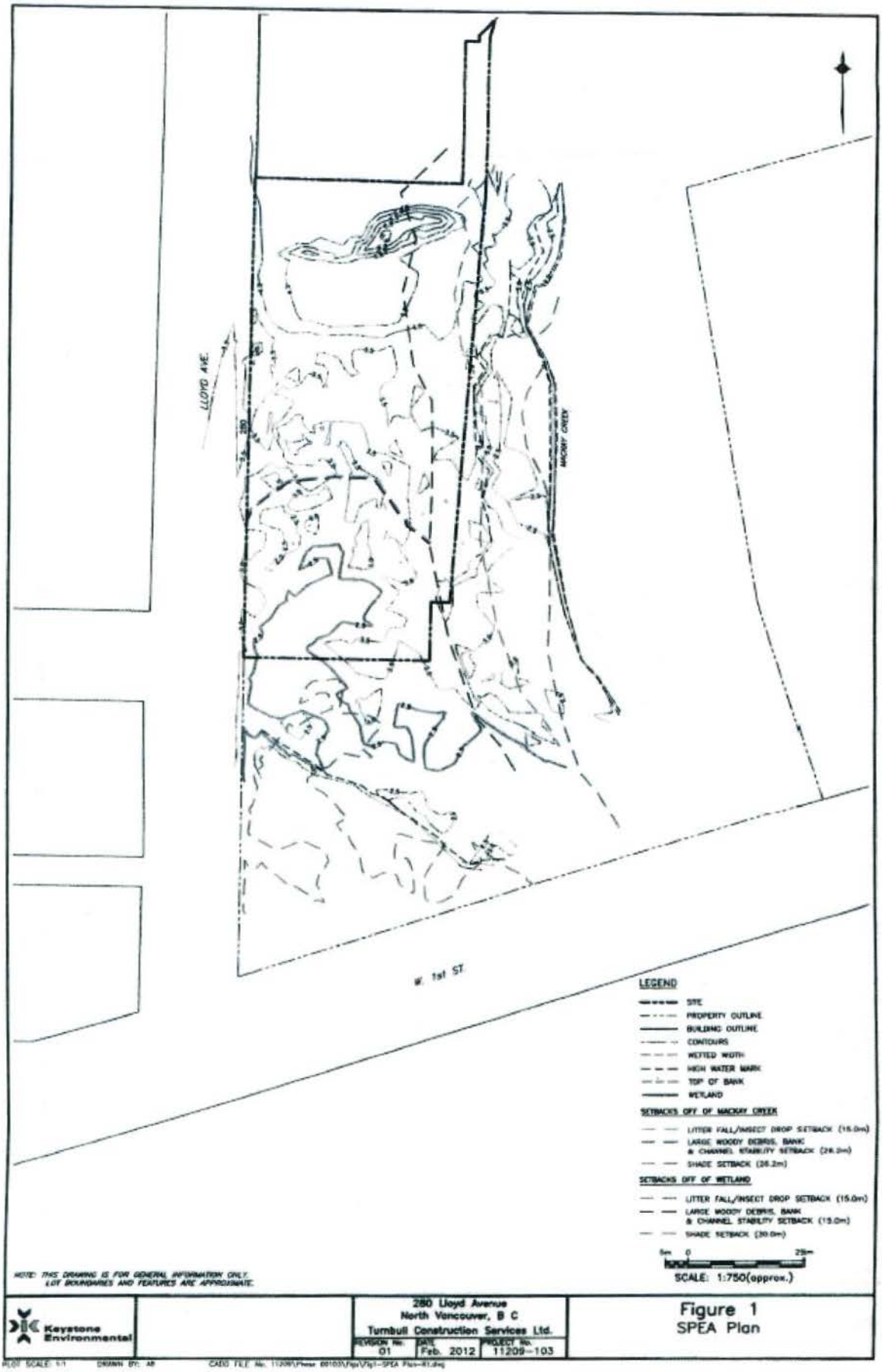
Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons						
LWD, Bank and Channel Stability ZOS (m)	15							
Litter fall and insect drop ZOS (m)	15							
Shade ZOS (m) max	30	South bank	Yes		No	x		
Ditch	Justification description for classifying as a ditch (manmade, no significant headwaters or springs, seasonal flow)				N/A			
Ditch Fish Bearing	Yes		No		If non-fish bearing insert no fish bearing status report			
SPEA maximum	15	(For ditch use table3-7)						

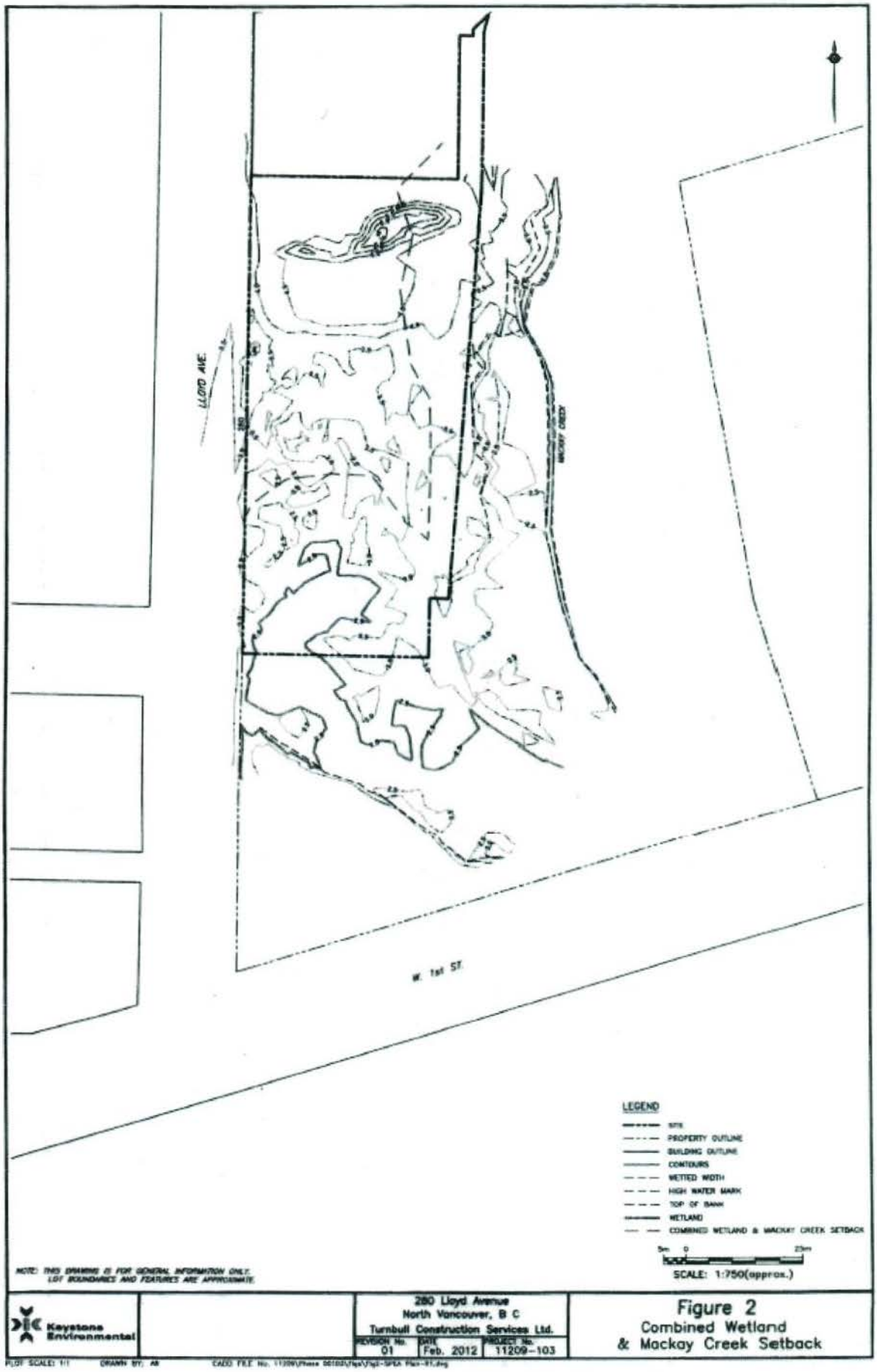
I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:

e) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
f) I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver;
g) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
h) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Comments

The high water mark of the wetland was determined using a laser level from a known elevation point. In total, 9 elevation measurements were taken for the wetland HWM, and then averaged for a final determination. This was determined to be at the 2.3 m mark.




LLOYD AVE.
MACKAY CREEK
W. 1st ST.
LEGEND
SITE
PROPERTY OUTLINE
BUILDING OUTLINE
CONTOURS
WETTED WIDTH
HIGH WATER MARK
TOP OF BANK
WETLAND
COMBINED WETLAND & MACKAY CREEK SETBACK
5m 0 25m
SCALE: 1:750(approx.)
NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. LOT BOUNDARIES AND FEATURES ARE APPROXIMATE.
Keystone Environmental
280 Lloyd Avenue
North Vancouver, B C
Turnbull Construction Services Ltd.
REVISION No. 01
DATE Feb. 2012
PROJECT No. 11209-103
Figure 2
Combined Wetland
& Mackay Creek Setback
PLOT SCALE: 1:1
DRAWN BY: AB

Section 4. Measures to Protect and Maintain the SPEA

This section is required for detailed assessments. Attach text or document files, as needed, for each element discussed in chapter 1.1.3 of Assessment Methodology. It is suggested that documents be converted to PDF *before* inserting into the assessment report. Use your "return" button on your keyboard after each line. You must address and sign off each measure. If a specific measure is not being recommended a justification must be provided.

1. Danger Trees	N/A – mostly vacant lot and trail; some tree removal to be don; DNV Arborist (Parks Dept.) will assess on on-going basis.
I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that: i) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; j) I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver; k) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
2. Windthrow	N/A – mostly vacant lot; to be assessed post-construction by District Arborist (Parks Dept.) on on-going basis
I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
3. Slope Stability	N/A - flat
I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
4. Protection of Trees	SPEA boundary to be marked and trees protected at drip line where they may hang over.
I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
5. Encroachment	Riparian encroachment is 37 m^2 due to meanders in the SPEA setback lines pulled from HWM of Mackay Creek
I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	

6. Sediment and Erosion Control	Plan to be developed by selected engineer and implemented under direction of DNV Parks

I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:

a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b. I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver;

c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

7. Stormwater Management	Stormwater will be directed to existing facility.

I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:

a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b. I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver;

c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

8. Floodplain Concerns (highly mobile channel)	N/A – no signs of change in thalweg within floodplain

I, Shawna E. Reed, Ph.D., R.P. Bio., hereby certify that:

a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b. I am qualified to carry out this part of the assessment of the development proposal made by the developer District of North Vancouver;

c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

Section 5. Environmental Monitoring

Attach text or document files explaining the monitoring regimen Use your "return" button on your keyboard after each line. It is suggested that all document be converted to PDF *before* inserting into the PDF version of the assessment report.
Include actions required, monitoring schedule, communications plan, and requirement for a post development report.

Prior to any clearing or grubbing, a nest survey will be conducted. Clearing and grubbing will be scheduled outside of the regular songbird nesting season (April – July) if possible. Given unknown start date, a nest survey may need to be redone to evaluate potential inhabitation by raptors or species at risk since the original assessment (Feb 2012).

Sediment and erosion control plan will be implemented under direction of project engineer and monitored on minimum weekly basis (more often during inclement weather) during construction.

A post-construction report will be submitted to the on-line RAR system.

Section 6. Photos

Label	Photograph 1
	
	Facing the west bank of MacKay Creek. A low gradient stream at this point.
Label	**Photograph 2**
	
	The riparian vegetation had well established tree, shrub,and forbs layers, but included invasive English Ivy, Himalayan blackberry and Japanese knotweed. DNV Parks has control programmes in place

Label	Photograph 3
	 MacKay Creek woody debris and riparian vegetation.
Label	**Photograph 4**
	 MacKay Creek and riparian vegetation; sand deposition in bottom right hand corner is this wider spot has resulted in sidebar formation
Label	**Photograph 5**

	 A Great Blue Heron in MacKay Creek: these birds are regularly seen fishing or foraging in the park area.
Label	Photograph 6
	 The MacKay Creek wetland: a beaver dam in the foreground and felled trees in background provide LWD and water retention.

Section 7. Professional Opinion

Assessment Report Professional Opinion on the Development Proposal's riparian area.

Date [ ]

1. I/We Shawna E. Reed, Ph.D., R.P. Bio.

Please list name(s) of qualified environmental professional(s) and their professional designation that are involved in assessment.)

hereby certify that:

a) I am/We are qualified environmental professional(s), as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am/We are qualified to carry out the assessment of the proposal made by the developer District of North Vancouver, which proposal is described in section 3 of this Assessment Report (the "development proposal"),
c) I have/We have carried out an assessment of the development proposal and my/our assessment is set out in this Assessment Report; and
d) In carrying out my/our assessment of the development proposal, I have/We have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation; AND

2. As qualified environmental professional(s), I/we hereby provide my/our professional opinion that:

a) ☑ if the development is implemented as proposed by the development proposal there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area in which the development is proposed, **OR**
(Note: include local government flex letter, DFO Letter of Advice, or description of how DFO local variance protocol is being addressed)

b) [ ] if the streamside protection and enhancement areas identified in this Assessment Report are protected from the development proposed by the development proposal and the measures identified in this Assessment Report as necessary to protect the integrity of those areas from the effects of the development are implemented by the developer, there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area in which the development is proposed.

[NOTE: **"qualified environmental professional"** means an applied scientist or technologist, acting alone or together with another qualified environmental professional, if
(a) the individual is registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association,
(b) the individual's area of expertise is recognized in the assessment methods as one that is acceptable for the purpose of providing all or part of an assessment report in respect of that development proposal, and
(c) the individual is acting within that individual's area of expertise.]

Appendix 40.12k: Grant Connell Tennis Court Expansion Raptor & Great Blue Heron Nesting Survey

Keystone Environmental
Knowledge-Driven Results

May 14, 2012

Mr. Benson Chow
Turnbull Construction Services Ltd.
15087 Victoria Avenue
White Rock, BC V4B 1G4

Dear Mr. Chow:

Re: Raptor and Great Blue Heron Nesting Survey
A Portion of 280 Lloyd Avenue and Surrounding Area
District of North Vancouver, BC
Project No. 11209

This letter presents the findings for a raptor and great blue heron nest survey prepared by Keystone Environmental Ltd. (Keystone Environmental) at the request of Turnbull Construction Services. The survey was completed in support of the Grant Connel Tennis Court expansion project (the Project), in the District of North Vancouver, BC.

PROJECT UNDERSTANDING

It is understood that the nesting survey was required to help inform Turnbull Construction Services of obvious raptor and/or heron presence at the Project site. It is also understood that a pre-clearing nesting survey will be completed to ensure compliance with the *Migratory Bird Convention Act* prior to land clearing it is to occur within the core migratory bird nesting season between April 1 and August 15.

METHODOLOGY

Previous habitat studies on-site observed stick nests within trees of the MacKay Creek riparian zone. The species utilization of the nests was not determined at the time of initial discovery and a recommendation for further study was made. A Keystone Environmental biologist visited the site and surrounding area on May 9, 10, and 11, 2012 to determine species utilization of nests observed. The methodology for the survey is summarized below:

- A site visit was completed to make observations with respect to the presence of raptors and great blue heron (*Ardea herodias*).
- The observation methodology consisted of traversing the area and conducting stand watch surveys of observed nests.

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Environmental Consulting
Engineering Solutions
Assessment & Protection

- Observations of birds were completed using visual and auditory identification of species.
- Care was taken to avoid unnecessary noise and movement to prevent disruption of wildlife and potential raptor breeding.

FINDINGS

Raptors and great blue herons were not observed during the survey. In addition, previously identified stick nests were not observed to be active at the time of the survey. Table 1 below lists the bird species identified.

Table 1 Summary of Observations

Common Name	Scientific Name
Northwestern Crow	*Corvus caurinus*
Black-capped Chickadee	*Poecile atricapillus*
American Robin	*Turdus migratorius*
Northern Flicker	*Colaptes auratus*
Steller's Jay	*Cyanocitta stelleri*
Song Sparrow	*Melospiza melodia*
Dark-eyed Junco	*Junco hyemalis*
Spotted-towhee	*Pipilo maculatus*

CLOSING

It is our opinion that the nests on-site are not those of raptors or great blue heron. We trust the information presented is sufficient for your current needs. Should you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

Keystone Environmental Ltd.

Andrew Booth, P.Biol., ISA Certified Arborist
PN-6580A, CRTA 537
Project Biologist

11209 120514 Raptor and Heron Survey.doc

ATTACHMENT:
- Keystone Environmental Ltd. General Terms and Conditions for Services

New Forest Edges

As stated, the stand within the site footprint has evidence of wind damage to the mature black cottonwood. It is surmised that a natural process of self-thinning is occurring in the forested area near MacKay Creek, which may be further enhanced by the historical urbanization of the area. Clearing from development activities will result in the creation of new forest edges south and east of the new GCTC expansion. At the east boundary, an existing forest edge exists outside of the chain link fence beyond the copse of young seral trees. These mature trees have grown exposed to prevailing eastward winds since the original clearing and showed evidence of adjustment to wind forces. Trunks of the mature cottonwood were elongated along the axis of prevailing eastern wind direction and the trunks showed moderate taper and development of reaction wood. The live crown ratios were in the 60% - 80% range, which is an indicator of stability. Clearing is not expected to significantly increase windthrow hazard to these trees; however, as winds move over the new GCTC structure, turbulence may be created on the leeward side of the building which can increase the risk of wind damage. Due to their large height, breakage potential exists for the mature black cottonwood.

South of this line of trees the new eastern forest edge is not considered windfirm in its present condition. The large black cottonwood trees in this area (trees numbered 93-96 on the attached drawing) will be subject to increased wind forces in the high canopy as mature trees are removed within the site footprint. Tree numbered 89 has evidence of a recent lean, with possible movement of the rootball and is therefore considered hazardous. Tree numbers 88 and 89 will have their critical root radii encroached during development, decreasing stability and increasing windthrow potential. The remaining black cottonwood are not in close enough proximity to neighbouring trees to gain structural integrity via branch and stem clash in wind events and represent a high wind throw and breakage hazard. Trees on the southeast site boundary have a relatively higher density and a decision on treatment should be deferred until after land clearing when requirements for a feathered boundary and distance to the GCTC expansion will be better defined.

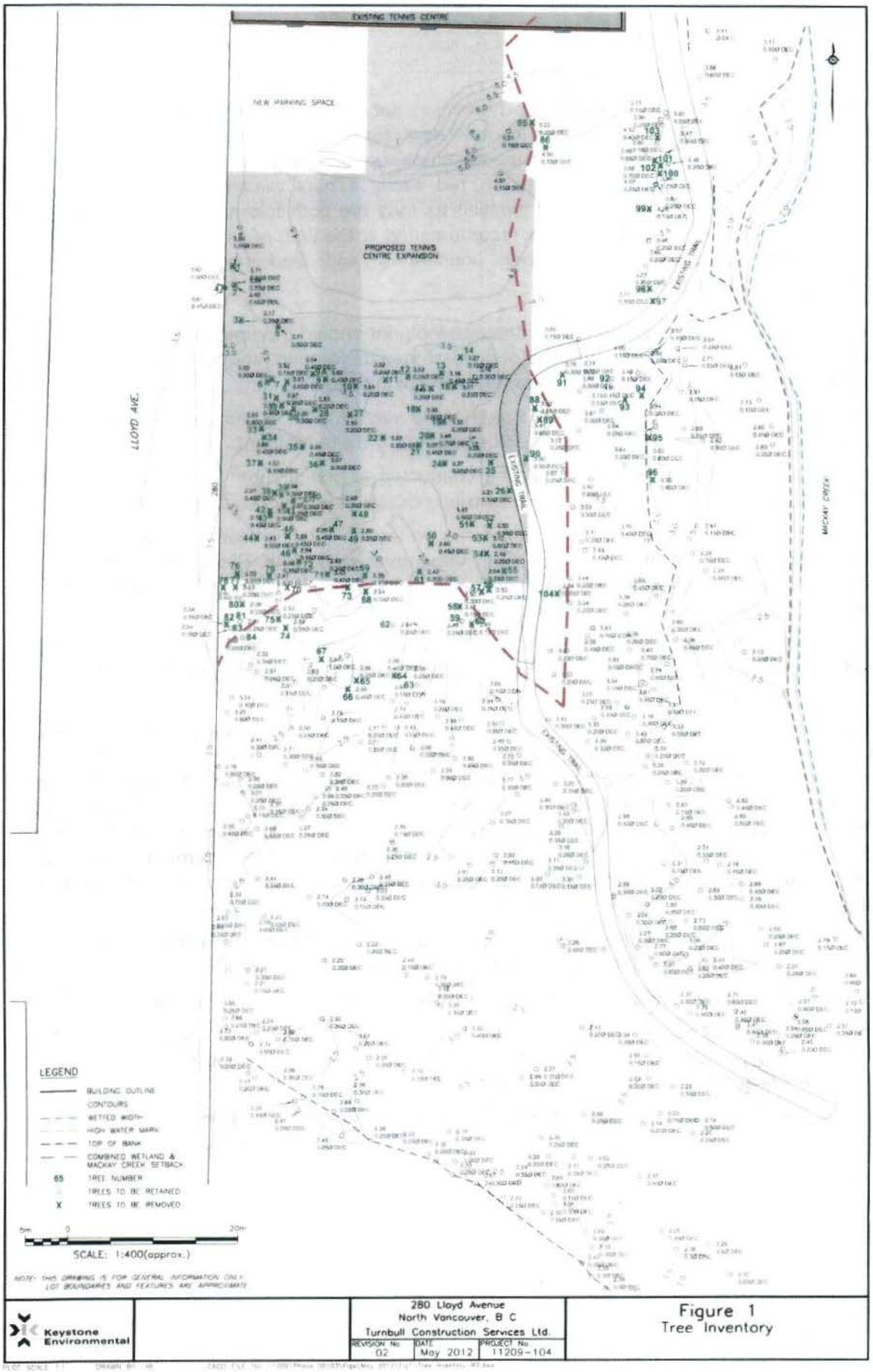
The new forest edge on the southern site boundary would be most susceptible to winds oriented in a southeasterly direction. The stand in this location consisted of a secondary canopy of red alder, and these trees receive structural support from their neighbours to dampen wind effects. Trees noted for preliminary removal outside of the site boundary include those that were potentially hazardous and within striking distance of the new GCTC structure.

RECOMMENDATIONS

The management objectives are to remove the mature black cottonwood within striking distance of the new GCTC expansion, feather the new forest edges of the remaining secondary canopy, and plant trees to represent a suppressed canopy. Alternative treatments for the black cottonwood, such as topping and crown reduction, are unlikely to be successful over the long term because of the tendency for robust epicormic growth in the black cottonwood which would replace the canopy and the susceptibility to wind damage. In addition, the wounds created from topping or crown reduction would leave the tree susceptible to pathogens, rot and internal decay at a location high in the canopy, thus increasing hazard potential over time. A requirement for ongoing monitoring would be required for topped and retained trees.

Feathering of the new forest edges of the remaining secondary canopy is accomplished by removing trees susceptible to failure in the new forest boundaries and by planting understory conifers. Planting to reflect a suppressed canopy will aid in deflecting winds up and above the remaining tree canopy. Western red cedar (*Thuja plicata*) and sitka spruce (*Picea sitchensis*) have been selected for planting as they are both tolerant of shade and high water tables. A follow up detailed review is recommended at the time of site clearing to develop a more accurate prescription to feather boundaries and address potential hazards. The following is recommended:

- Trees recommended for removal within the site footprint should be done so as per standard land clearing practices. Trees removed outside of the site footprint should be done so using low impact methods so as not to damage any remaining trees.
- Remove trees 88, 89, 91, 93-96, 97-103 east of the site footprint. Remove trees 56, 57, 58, 60, 64, 65-68, 74, 75, 77, 78, 80, 82, and 104 south of the site footprint.
- A follow up detailed assessment should be conducted in conjunction with land clearing to refine treatment recommendations and determine additional tree removal requirements.
- Prior to the commencement of work, install tree protection fencing along the southern and eastern site boundary to the District of North Vancouver standards. Protection of the forest en-mass will be more effective than protecting individual trees. This fencing will also serve to protect the riparian zone.
- Use organic mulch on the section of relocated trail so as to minimize impacts to the underlying root systems. Field fit the path routing to minimize impacts to the critical root radius of any tree.
- Tree replacement should be at a 2:1 ratio with a species breaks-down of western red cedar and sitka spruce at 1:1, pending approval by regulatory bodies. Trees to be planted are recommended at 1.75 m approximate height, bound and burlapped to maximize the probability of survival. These should be planted from the site boundary into the forest edge up to 20 m where areas for planting are available. This will require provisions for field modification to landscape plans. Though the preliminary number of replacement trees is 60, this will require verification following the recommended detailed assessment at the time of clearing.
- Where trees to be removed or altered are within the determined fisheries setbacks, approval from Fisheries and Oceans Canada should be obtained prior to any work.
- Retain some coarse woody debris within the remaining forest to complex habitat.
- Prior to land clearing during the core migratory bird nesting season (April 1 to August 15), nesting surveys should be completed to remain compliant with the federal *Migratory Bird Convention Act* and the provincial *Wildlife Act*.
- Monitor the forest edges during and after construction for windthrow hazard.
- Remove invasive ivy from trees in the riparian zone.



Keystone Environmental

280 Lloyd Avenue
North Vancouver, B C
Turnbull Construction Services Ltd.

REVISION No.	DATE	PROJECT No.
02	May 2012	11209-104

Figure 1
Tree Inventory

Document: 1881985

Table 1 Onsite Trees to be Removed

Tag #	DBH	Height (m)	Species	Crown Class	Tree Management	Comments
1	64	35	Black cottonwood	Dominant	Remove	Good form and vigour
2	72	35	Black cottonwood	Dominant	Remove	Good form and vigour
3	23	8	Black cottonwood	Intermediate	Remove	Fork at 4m, dead top
4	53	26	Black cottonwood	Dominant	Remove	Good form and vigour
5	45	16	Red alder	Intermediate	Remove	Ivy covering tree trunk to 10 m
6	20	6	Red alder	Suppressed	Remove	Ivy on tree trunk, 20° lean NW, poor taper
7	11	6	Red alder	Suppressed	Remove	Ivy on tree trunk, 20° lean NW, poor taper
8	50	19	Red alder	Intermediate	Remove	Ivy to 12 m, lean 22°N, fair condition
9a	40	22	Red alder	Intermediate	Remove	Trunk deformity at base, fair condition
9	40	22	Red alder	Intermediate	Remove	Fair condition
10	22	24	Red alder	Intermediate	Remove	20° lean NE, dead ivy to height, fair condition
11	20	11	Red alder	Intermediate	Remove	Ivy over entire tree, no assessment of defects
12	25	25	Red alder	Intermediate	Remove	Ivy to 4m, dead top, lean 11°N, poor form
13	45	20	Red alder	Intermediate	Remove	Fair condition, lean 13°N, ivy to ¾ tree height
14	15	5	Red alder	Suppressed	Remove	Poor condition, curve in trunk
15	20	5	Red alder	Suppressed	Remove	Poor condition, north lean
16	25	21	Red alder	Intermediate	Remove	Dead ivy to 12 m, lean 22°N
17	20	21	Red alder	Intermediate	Remove	Dead ivy to 12 m, lean 22°N
18	90	40	Black cottonwood	Dominant	Remove	Double stem at 2.5 m, forked top of main stem at ¾ height, lean 10°N
19	36	21	Black cottonwood	Sub-dominant	Remove	Tall and thin, lean 11°N, fair condition
20	70	40	Black cottonwood	Dominant	Remove	Trunk deformity, dead ivy to ¾ height
21	40	34	Black cottonwood	Sub-dominant	Remove	Possible cavity at base, minor chlorosis, fair condition

Tag #	DBH	Height (m)	Species	Crown Class	Tree Management	Comments
22	80	40	Black cottonwood	Dominant	Remove	Good form, heavy top with multiple large branches
23	34	24	Black cottonwood	Sub-dominant	Remove	Hazard, standing dead hung up in dead red alder
24	65	45	Black cottonwood	Dominant	Remove	Tall with little trunk taper
25	20	16	Red alder	Intermediate	Remove	Ivy up stem, obscuring assessment. Rot at 3m
26	15	12	Red alder	Intermediate	Remove	Possible cavity, tall and thin
27	23	14	Red alder	Intermediate	Remove	Ivy to 4m, tall and thin, fair condition
28	23	16	Red alder	Intermediate	Remove	Ivy to 12m, tall and thin, fair condition
29	32	15	Red alder	Intermediate	Remove	Ivy to 12m, tall and thin, fair condition
30	46	15	Red alder	Intermediate	Remove	Ivy to 12m, tall and thin, fair condition
31	20	8	Red alder	Suppressed	Remove	Ivy to top of tree, poor condition
32	25	10	Red alder	Suppressed	Remove	Bark sloughing, covered in ivy, poor condition
33	52	34	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
34	41	34	Red alder	Intermediate	Remove	Fair condition. Ivy to ¾ height of tree
35	24	17	Red alder	Intermediate	Remove	Fair condition. Ivy to ¾ height of tree
36	21	18	Red alder	Intermediate	Remove	Hazard, standing dead, possible basal cavity
37	13	5	Big leaf maple	Suppressed	Remove	Good form and vigour
38	41	25	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
39	37	25	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
40	35	25	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
41	53	26	Red alder	Intermediate	Remove	Good condition
42	41	30	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
43	40	10	Red alder	Suppressed	Remove	Trunk split at 3.5 m, included bark, ivy up tree
44	21	22	Bitter cherry	Intermediate	Remove	Covered in ivy, cannot assess defects

Tag #	DBH	Height (m)	Species	Crown Class	Tree Management	Comments
45	30	22	Red alder	Intermediate	Remove	Epicormic growth to height of alder canopy
46	31	22	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
47	43	21	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
48	28	15	Red alder	Intermediate	Remove	Poor condition, 30° lean NE against other tree
49	25	17	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
50	52	46	Black cottonwood	Dominant	Remove	Covered in ivy, cannot assess defects
51	50	40	Black cottonwood	Dominant	Remove	Dead ivy to 20 m, poor taper
52	55	40	Black cottonwood	Dominant	Remove	Dead ivy to 20 m, poor taper
53	54	40	Black cottonwood	Dominant	Remove	Kink in stem at 14 m, poor taper
54	19	12	Red alder	Suppressed	Remove	Fair condition, poor taper
55	25	17	Red alder	Intermediate	Remove	Cavity at branch scar 3 m, fair condition
61	32	20	Red alder	Intermediate	Remove	Ivy to 1/2 tree height, poor taper
69	25	18	Red alder	Intermediate	Remove	Standing dead
70	40	22	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
71	36	22	Red alder	Intermediate	Remove	Ivy up ¾ tree, possible sap rot in top
72	36	22	Red alder	Intermediate	Remove	Covered in ivy, cannot assess defects
73	35	21	Red alder	Intermediate	Remove	Trunk curvature, fair condition
76	31	20	Red alder	Intermediate	Remove	Ivy up ¾ tree, lean 15° west
79	32	21	Red alder	Intermediate	Remove	Epicormic growth at 10 m to height, fair condition
85	20	10	Black cottonwood	Sub-dominant	Remove	Growing on fill, good form and vigour
86	16	9	Black cottonwood	Sub-dominant	Remove	Growing on fill, good form and vigour
90	50	46	Black cottonwood	Dominant	Remove	Poor taper, dead ivy to 10 m, inactive nest in canopy

Table 2 Offsite Tree List with Recommendations

Tag #	DBH	Height (m)	Species	Crown Class	Tree Management	Comments
56	27	20	Red alder	Intermediate	Remove	Critical root radius within building footprint, fair condition, 15° lean SE
57	22	20	Red alder	Intermediate	Remove	Critical root radius within building footprint, cracking at base, signs of internal decay and possible cavity, poor condition
58	21	19	Red alder	Intermediate	Remove	Critical root radius within building footprint, fair condition, tall and thin
59	26	21	Red alder	Intermediate	Retain, no protection required	Fair condition, tall and thin
60	17	17	Red alder	Intermediate	Remove	Poor taper, sap rot in leader
62	34	20	Red alder	Intermediate	Retain, add tree protection 4.0 m on north side	Ivy over ¾ height, trunk curvature
63	25	20	Red alder	Intermediate	Retain, no protection required	Reaction wood on trunk opposite 6° lean, trunk curved
64	40	25	Red alder	Intermediate	Remove	Hazard, scarring at 4m around 70% stem, breakage hazard
65	25	17	Red alder	Intermediate	Remove	Epicormic growth at 10 m to height, minor stem deformities, poor condition
66	40	18	Red alder	Intermediate	Remove	Epicormic growth at 10 m to height, poor condition
67	97	43	Black cottonwood	Dominant	Remove	*Hazard*, old break at 12 m has co-dominant stem growth of large diameter, extensive internal decay extending to roots
68	24	19	Red alder	Intermediate	Remove	*Hazard*, standing dead,
74	35	19	Red alder	Intermediate	Remove	Epicormic growth at 10 m to height, cavity present at 10 m, poor condition
75	25	20	Red alder	Intermediate	Remove	Epicormic growth at 10 m to height, poor condition

Tag #	DBH	Height (m)	Species	Crown Class	Tree Management	Comments
77	40	20	Red alder	Intermediate	Remove	Critical root radius within building footprint, fill around base, lean 18° W, fair condition
78	34	20	Red alder	Intermediate	Remove	Critical root radius within building footprint, fill around base, lean 18° W, fair condition
80	30	21	Red alder	Intermediate	Remove	Critical root radius within building footprint, epicormic growth at 10 m to height, cavity present at 10 m, poor condition
81	26	19	Red alder	Intermediate	Retain, no protection required	Poor taper
82	31	19	Red alder	Intermediate	Remove	Poor form, dead branch at 8 m, possible internal decay, lean 14° W, poor condition
83	32	20	Red alder	Intermediate	Retain	Lean 14° W, fair condition
84	24	19	Red alder	Intermediate	Retain	Poor taper, epicormic growth, poor condition
87	13	8	Red alder	Suppressed	Retain	Lean 30° N, small basal scar, intersects with trail
88	81	46	Black cottonwood	Dominant	Remove	West root exposed, ivy up stem. Critical root zone will be impacted by footprint creating windthrow hazard
89	61	46	Black cottonwood	Dominant	Remove	Hazard, recent lean 15° east, trail over critical rootzone, high windthrow/failure potential
91	30	14	Red alder	Suppressed	Remove	Lean 24° N over trail, dead ivy up stem
92	41	30	Red alder	Intermediate	Retain and monitor	Lean 18° N over trail, roots exposed on S side tree.
93	56	49	Black cottonwood	Dominant	Remove	Poor taper, tall, treat for wind hazard
94	47	49	Black cottonwood	Dominant	Remove	Poor taper, tall, treat for wind hazard
95	63	49	Black cottonwood	Dominant	Remove	Poor taper, tall, treat for wind hazard
96	54	49	Black cottonwood	Dominant	Remove	Poor taper, tall, treat for wind hazard
97	49	31	Black cottonwood	Dominant	Remove	Oval trunk oriented to wind direction, minor kinks in stem, trail over critical root zone

Tag #	DBH	Height (m)	Species	Crown Class	Tree Management	Comments
98	34	18	Black cottonwood	Dominant	Remove	Fair condition
99	62	42	Black cottonwood	Dominant	Remove	Oval trunk oriented to wind direction, moderate taper
100	57	42	Black cottonwood	Dominant	Remove	Grows with 101 and 102, oval trunk oriented to wind direction, no lean
101	61	42	Black cottonwood	Dominant	Remove	Grows with 100 and 102, oval trunk oriented to wind direction, no lean
102	74	42	Black cottonwood	Dominant	Remove	Grows with 100 and 101, oval trunk oriented to wind direction, no lean, trail over critical root zone
103	41	22	Red alder	Intermediate	Remove	Lean 26° W, oval trunk oriented to wind direction, good condition
104	20	Not assessed	Not assessed	Not assessed	Remove	Critical root radius within building footprint, condition not assessed

Appendix 40.12m: Geotechnical Assessment of Flood Hazard at Grant Connell Tennis Centre

GeoPacific Consultants Ltd.

#215 -1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
Phone (604) 439-0922 / Fax (604) 439-9189

North Vancouver Recreation Commission
c/o Turnbull Construction Services Ltd.
15087 Victoria Avenue
White Rock, B.C.
V4B 1G4

May 23, 2012
File: 10191

Attention: Benson Chow

Re: Geotechnical Assessment of Flood Hazard at Grant Connell Tennis Centre
280 Lloyd Avenue, North Vancouver, B.C.

You have asked for our comments regarding the flood risk at the above referenced site. The current facility is to be expanded with some new structures proposed for the currently vacant lands to the south of the existing development. The site is located on the east side of Lloyd Avenue, south of West 3rd Street in North Vancouver. The site immediately adjacent to and west of Mackay Creek.

Northwest Hydraulics Consultants completed a report for Natural Resources Canada, entitled *Flood Assessment Study North Vancouver*, dated March 31st 2010. The report provides flood plain mapping for a number of creeks in North Vancouver, including Mackay Creek. Based on the study undertaken, the existing structures are located above the 200 year flood plain level for Mackay Creek and based on the location of the flood plain boundary in relation to survey data provided to us, we have extrapolated a 200 year flood plain level of 4.1 m geodetic at the site. The flood construction level (FCL) includes a freeboard that is typically 0.6 m above the flood plain level, to account for uncertainties in the flood hazard analysis. Thus for the subject site the FCL would be 4.7 m.

Preliminary plans prepared by Shape Architecture show the additions would consist of 3 tennis courts situated in a single larger structure near the existing buildings and amenity space, viewing, mechanical and storage to the south.

Given the proposed usage, it may be feasible to construct below the flood construction level as there is no permanent habitation proposed and storage and or sensitive equipment could be located above the FCL, accessed by stairs or a ramp. Alternatively the entire addition area could be elevated to slightly above the current building grades and be fully above the FCL.

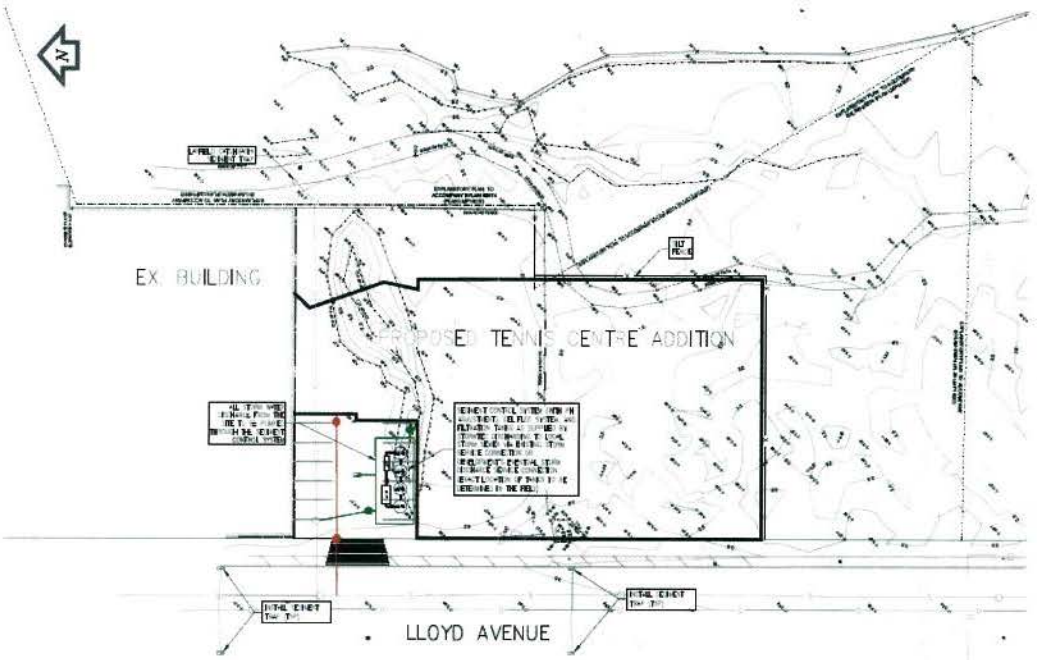
In our opinion the site can be safely developed for the purpose intended. Filling to desired grades beneath the structures would need to be done using compacted engineered fill placed under our supervision.

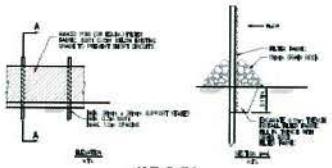
For:
GeoPacific Consultants Ltd.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
M. J. KOKAN
21364

May 23, 2012.

Matt Kokan, M.A.Sc., P.Eng.
Principal





SILT FENCE DETAIL

CLEARING, ROAD STRIPPING, GRAVELLING, AND ROUGH GRADING STAGE

1. DEVELOPER TO NOTIFY BOTH THE ENGINEER OF RECORD AND THE ESC SUPERVISOR THAT CLEARING AND GRUBBING HAS COMMENCED. DEVELOPER TO PROVIDE THE CLEARING AND GRUBBING CONTRACTOR WITH A COPY OF THE ESC PERMIT AND TREE CUTTING PERMIT, INCLUDING DRAWINGS.
2. SITE CLEARING AND GRUBBING CONTRACTOR TO CONFIRM ESC PERMIT HAS BEEN ISSUED. THERE IS A COPY ON SITE AND THE PERMIT SIGNAGE IS ERECTED AT THE SITE ENTRANCE.
3. SHOULD THE SITE CONTAIN OR BE ADJACENT TO A PARK, THE CLEARING AND GRUBBING CONTRACTOR MUST CONTACT CHRIS VELA, AT (604) 591-4086 TO DISCUSS THE REMOVAL OF HAZARDOUS TREES.
4. PERIMETER ESC MEASURES TO BE INSTALLED AFTER MEETING ABOVE PARTIES AS APPLICABLE AND PRIOR TO COMMENCING ONSITE CLEARING AND GRUBBING.
5. INSTALL PROTECTIVE MEASURES AT OR WITHIN EXISTING CATCH BASINS/DRAINS AS APPLICABLE.
6. INSTALL SPECIFIED ESC ACCESS FACILITIES/MEASURES AT ENTRY/EXIT POINTS. ALL VEHICLE MOVEMENTS TO AND FROM THE SITE ARE TO BE RESTRICTED TO CONTROLLED ENTRY/EXIT POINTS.
7. PRIOR TO LEAVING THE SITE ON-SITE CLEARING AND GRUBBING CONTRACTOR OBTAIN SIGN OFF BY THE ESC SUPERVISOR.
8. DEVELOPER WILL BE RESPONSIBLE TO PROVIDE A COPY OF THE ESC PLAN AND PERMIT TO THE GENERAL CONTRACTOR.
9. GENERAL CONTRACTOR TO HAVE A COPY OF THE ESC PLAN AND PERMIT ONSITE AT ALL TIMES, AND ENSURE ESC MEASURES ARE IN PLACE.
10. ONSITE STORM WATER CONTROL FACILITIES, COMPLETE WITH VELOCITY CONTROL MEASURES TO BE INSTALLED AS ROADWAYS ARE STRIPED.
11. ANY STOCKPILED MATERIAL TO BE COVERED AND ENCIRCLED BY SEDIMENT FENCE AS SPECIFIED.
12. THE ENGINEER-OF-RECORD/ESC SUPERVISOR WILL BE RESPONSIBLE TO ENSURE THAT THE EXISTING ROADS ARE WASHED DAILY AND SWEPT REGULARLY. FLUSHING OF ROADWAYS IS PROHIBITED.
13. AFTER ROUGH LOT GRADING IS COMPLETED, ALL DISTURBED AREAS ARE TO BE PROTECTED AS PER THE ESC PLAN.
14. UPON THE COMMENCEMENT OF WORK, ESC SUPERVISOR TO CONDUCT MONITORING AS PER THE DISTRICT OF NORTH VANCOUVER MONITORING AND REPORTING REQUIREMENTS.

UTILITY AND ROAD WORKS INSTALLATION STAGE

1. CONTRACTOR TO INSTALL TEMPORARY SEDIMENT CONTAINMENT AND CONTROL MEASURES AS SPECIFIED IN THE APPROVED ESC PLAN AND AS DIRECTED BY THE ESC SUPERVISOR.
2. CONTRACTOR TO INSTALL ADDITIONAL SEDIMENT FENCING AS INDICATED ON THE ESC PLAN AND AS DIRECTED BY THE ESC SUPERVISOR OR ENGINEER-OF-RECORD.
3. ALL ACCESS TO AND FROM SITE TO BE FROM THE RESTRICTED ENTRY-EXIT POINTS.
4. ESC SUPERVISOR TO CONDUCT MONITORING AS PER THE DISTRICT OF NORTH VANCOUVER MONITORING AND REPORTING REQUIREMENTS.
5. CONTRACTOR TO ENSURE THAT ESC MEASURES ARE WELL MAINTAINED, CLEANED, REPAIRED OR REPLACED AS REQUIRED.
6. CATCH BASINS SHALL HAVE COMPLETE WITH PROTECTIVE MEASURES ARE TO BE INSTALLED BY THE CONTRACTOR AT THE FIRST OPPORTUNITY.
7. CONTRACTOR TO CO-ORDINATE THE ELIMINATION OF TEMPORARY ESC FACILITIES. IF THEY ARE NO LONGER REQUIRED DUE TO FACILITIES BEING OPERATIONAL WITH THE ESC SUPERVISOR. ADDITIONAL ESC FACILITIES MAY NEED TO BE INSTALLED AS PER THE DIRECTION OF THE ESC SUPERVISOR.

LAYFIELD – CATCH BASIN SEDIMENT TRAP

Layfield's Catch Basin Sediment Traps (CBST's) are placed in catch basins to filter silt from runoff water.

When installed and maintained properly, the CBST removes silt and particulate matter from runoff water, preventing the fouling of the stormwater system and protecting the downstream aquatic environments from siltation. The CBST is an economical and effective method to minimize your firm's costly clean-up work. The potential liability to downstream environmental damage makes the CBST an obvious choice for construction sites and earthwork projects. Layfield's brochure the CBST is a sediment trap; grates are the responsible party. Silt control devices are site, available. The family of Layfield's CBST's is manufactured from 6 gauge galvanized steel. The standard design includes a polyester filter sock which prevents the fine catch basin, and a full apron portion. The apron rests between the grate and the catch basin ledge and is supported by a wire frame which adjusts to fit most standard catch basins. Layfield's CBST design includes a high strength lifting straps, and install condition slots at the top of the sediment filter section. The relief slots allow water to escape into the catch basin if the CBST has been filled with silt.

Layfield's CBST is an effective tool in your efforts to meet environmental regulation. The CBST also prevents costly clean up costs caused by siltation of the storm water system. These types of devices have been approved as Best Management Practices (BMP's) in much of the U.S. For more information on Layfield's Catch Basin Sediment Trap, please call your Layfield representative.

GRAPHIC SCALE

SCALE 1:250

SEDIMENT CONTROL NOTES:

1. UNDER THIS PLAN, ALL PERSONS INCLUDING BUT NOT LIMITED TO THE DEVELOPER, OWNER OF THE LAND, THE ENGINEER OF RECORD, ESC SUPERVISOR, CIVIL CONTRACTOR, CIVIL SUB-CONTRACTOR, BUILDER & BUILDING SUB-TRADES HEREIN AFTER REFERRED TO AS THE OWNER/DEVELOPER/PERSON RESPONSIBLE ENGAGED ON SITE SHALL COMPLY WITH ALL REGULATORY REQUIREMENTS SPECIFIED IN FEDERAL, PROVINCIAL AND MUNICIPAL AUTHORITIES, PERTAINING TO ON SITE MANAGEMENT AND DISCHARGE ASSOCIATED WITH EROSION AND SEDIMENT CONTROL REGULATIONS.
2. IN ACCORDANCE WITH DISTRICT OF NORTH VANCOUVER MUNICIPAL EROSION AND SEDIMENT CONTROL (ESC) BYLAW NO. 7811 OR 7388, BYLAW, THE ESC PERMIT, THE PERMIT OF WHICH THE PLAN FORMS PART THEREOF, BEING THE OWNER BUILDER, ULTIMATELY RESPONSIBLE FOR ALL SITE ACTIVITIES THAT RESULT IN A BREACH OF COMPLIANCE WITH THE BYLAW, FOR THE DURATION OF THE PERMIT.
3. THE DEVELOPER/PERSONS RESPONSIBLE SHALL ENSURE THAT ALL CONTRACTOR ACTIVITIES ARE UNDERTAKEN IN A MANNER THAT ENSURE BEST MANAGEMENT PRACTICES ARE IMPLEMENTED TO PREVENT AND CONTAIN ON-SITE, BUT LIMITED RUNOFF THAT EXCEEDS PERMITTED AS SPECIFIED BY THE BYLAW, FROM ENTERING DOWNSTREAM DRAINAGE INFRASTRUCTURE AND AQUATIC SYSTEMS.
4. THE ESC SUPERVISOR SPECIFIED UNDER THE ESC PERMIT IS RESPONSIBLE TO THE MONITOR, INSPECT AND REPORT TO THE DEVELOPER, CONTRACTOR, AND DISTRICT ON EROSION AND SEDIMENT CONTROL FACILITIES AND THE COMPLIANCE PERFORMANCE IN ACCORDANCE TO THE DISTRICT'S SEDIMENT CONTROL POLICIES.
5. THE DEVELOPER/OWNER/PERSONS RESPONSIBLE MUST COMPLY WITH THE ESC PLAN WITHIN THE SPECIFIED TIMEFRAME AND COMPLY WITH ALL INSTRUCTIONS ISSUED BY THE ESC SUPERVISOR TO RECTIFY DEFICIENCIES THAT RESULT IN NON-CONFORMANCE WITH THE PERMIT.
6. ALL SITE AND/OR LOT ACCESS FROM DISTURBED AREAS TO PAVED SURFACES IS TO BE RESTRICTED TO SPECIFIED ACCESS FACILITIES TO LIMIT THE TRANSPORT OF SEDIMENT ONTO ROADWAYS DURING THE BUILDING/FRAME VEHICLE ACCESS TO THE DISTURBED AREAS IS TO BE LIMITED TO GRAVEL PADS ONLY.

MAINTENANCE ALL STAGES (AS APPLICABLE)

1. ALL INSPECTIONS/MONITORING TO BE CARRIED OUT BY ENGINEER OF RECORD OR ESC SUPERVISOR UP TO THE EXPIRY OF THE PERMIT.
2. UPON INSTRUCTION/NOTIFICATION BY THE ENGINEER OF RECORD OR ESC SUPERVISOR, PERSONS RESPONSIBLE ARE REQUIRED TO UNDERTAKE MAINTENANCE ACTIVITIES AS DEEMED SPECIFIED TO MODIFY OR MAINTAIN ESC FACILITIES.
3. ALL CATCH BASIN SEDIMENT TRAPS ARE TO BE INSPECTED WEEKLY OR FOLLOWING STORM EVENTS. INLINE FILTERS ARE TO BE REMOVED AND CLEANED AT 40% CAPACITY.
4. ACCUMULATED SEDIMENT DEPOSITION IN POND INLETS AND RISING INLET BARS ARE TO BE REMOVED AT 50% CAPACITY.
5. GRAVEL ACCESS PADS TO BE INSPECTED DAILY TO ENSURE FUNCTIONALITY, ADD ADDITIONAL ROCK AS REQUIRED.
6. THE DEVELOPER OR BUILDER MUST REGULARLY CLEAN PAVED ROAD SURFACES. IF ACCUMULATED SEDIMENTS AT THE END OF EACH DAY OR AS REQUIRED, NO SOIL, SAND OR OTHER MATERIAL WITH A HIGH SEDIMENT CONTENT SHALL BE DEPOSITED ON ROAD OUTSIDE OF THE PROPERTY BOUNDARIES, PARTICULARLY ON PAVED ROAD SURFACES.
7. SEDIMENT FENCES/BARRIERS TO BE INSPECTED AND REPAIRED PRIOR TO EXPECTED RAIN EVENTS AND FOLLOWING ALL SIGNIFICANT STORM EVENTS. OR PERIODS OF EXTENDED RAIN. ACCUMULATED SEDIMENTS GREATER THAN 30% OF THE FENCE CAPACITY OR REFERENCES SHOULD BE DEALT WITH ACCORDINGLY.
8. ALL SEDIMENT REMOVED FROM ESC CONTROL FACILITIES TO BE DISPOSED OF IN A MANNER AS TO NOT CONTRIBUTE OR COMPROMISE THE SEDIMENT LOADING OF OTHER CONTROL MEASURES.

FINAL GRADING STAGE THROUGH TO SUBSTANTIAL COMPLETION

1. GENERAL CONTRACTOR TO ENSURE THAT STORMWATER IS TO BE DISCHARGED TO THE STORM SEWER SYSTEM ON LLOYD AVENUE.
2. CONTRACTOR TO ENSURE THAT ESC FACILITIES SPECIFIED IN THE ESC PLAN OR ANY ADDENDUMS ARE IMPLEMENTED ACCORDINGLY.
3. AFTER FINAL LOT GRADING IS COMPLETED, ALL DISTURBED AREAS ARE TO BE PROTECTED AS PER THE ESC PLAN.
4. CONTRACTOR TO CO-ORDINATE THE ELIMINATION OF TEMPORARY ESC FACILITIES AS THEY ARE NO LONGER REQUIRED WITH THE ESC SUPERVISOR. ADDITIONAL ESC FACILITIES MAY NEED TO BE INSTALLED AS PER THE DIRECTION OF THE ESC SUPERVISOR.
5. AT FINAL SITE INSPECTION PRIOR TO THE SITE GOING ON-MAINTENANCE ESC SUPERVISOR IN ASSOCIATION WITH DRAINAGE AND ENVIRONMENT STAFF TO INSPECT AND SIGNOFF ON ESC MEASURES PRIOR TO THE SITE GOING ON-MAINTENANCE.
6. DEVELOPER TO ENSURE THAT THE LOT OWNER AND/OR HOUSE BUILDER ARE NOTIFIED OF EXISTING ESC FACILITIES AND THEIR RESPONSIBILITIES TO ENSURE THAT INDIVIDUAL PRIVATE ONSITE SEDIMENT CONTROL MEASURES ARE TO BE KEPT IN PLACE AND PERFORM TO THE STANDARD OF THE ESC PLAN.
7. DEVELOPER TO REMAIN THE REMARKS OF THE ESC SUPERVISOR UNTIL 80% OF BUILDING CONSTRUCTION INCLUDING LANDSCAPING OF THE LOTS HAS BEEN COMPLETED. THE ESC PERMIT WILL BE IN FULL FORCE AND EFFECT DURING THIS TIME PERIOD.

SHAPE Architecture Inc

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PLOT INFO

NOTES

NO. DESCRIPTION

REVISIONS

NO. DATE DESCRIPTION

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GRANT CONNELL TENNIS CENTRE EXPANSION

ESC PLAN

DATE	MAY 14-2012
DRAWN BY	CG
CHECKED BY	CN
SCALE	1:250
JOB NUMBER	1590

C2

Appendix 40.12o: Grant Connell Tennis Centre Expansion Drawing C3

Appendix 40.12p: Legal Survey